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Through Cooperative Effort The Nation's Food Supply Is Insured

The success of the veterinary profession's labors to provide an animal industry sufficient for the country's need in any emergency may be attributed to the American farmer's having developed a keen understanding of the potentiality of animal disease uncombated by scientific methods of control, and having vested the responsibility for that control in the hands of graduate veterinarians. But disease-fighting efforts in the absence of a reliable service of supply—such as that maintained by "Corn States"—could not proceed with any assurance of result. Through, however, the cooperation of all interests concerned, the nation's food supply is a stable entity the future of which appears to be insured.

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The Rôle of the Veterinarian in Effective Immunization Against Hog Cholera with Tissue Vaccine*

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A FALLACY commonly believed by the layman, and perhaps occasionally by the veterinarian as well, is that the establishment of an adequate immunity against hog cholera may be accomplished by merely introducing a satisfactory immunizing agent into the animal tissues. Those subscribing to this fallacy proceed on the assumption that every pig that looks healthy is healthy and that every sick pig is almost certainly suffering from cholera. For these reasons anti-hog-cholera serum and hog-cholera virus have, in many instances, been used for the immunization of swine against hog cholera under unwarranted conditions, and this improper use of serum and virus has led to serious losses and to widespread infection. The indiscriminate use of the serum-virus method of immunization, while it may limit the immediate losses from hog cholera, is not a suitable means of preventing the spread of the disease, and any method which requires the use of unmodified virus certainly can not be depended upon to eradicate the infection.

The so-called "breaks," which often follow the administration of anti-hog-cholera serum and virus for the immunization of swine against cholera, are frequently attributed to the impotency of the serum or the inactivity of the virus used, whereas the products are, in fact, usually potent and active, and the losses are due to the use of these products under conditions which make their administration dangerous and unsatisfactory. Attempts to immunize pigs which are not properly fed or cared for, or those suffering from parasitic infestation, or intercurrent disease such as infectious pneumonia or paratyphoid infection, nearly always result unsatisfactorily, and heavy losses often are incurred.

For successful results with any method of active immunization it is necessary to know the limitations of the immunizing agent used and the proper method of using it, to observe the necessary sanitary measures and to recognize the importance of differentiating hog cholera from other infections of swine with which it may be confused.

Hog-cholera tissue vaccine has been described at length in previous publications[1, 2] on the subject and is, briefly, a

*Read by title at the 77th annual meeting of the AVMA, Washington, D. C., August 26-30, 1940.

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[1]Boynton, W. H.: A tissue vaccine for hog cholera. J.A.V.M.A., lxxxiii (1933), n. s. 36 (6), pp. 747-763.

[2]Boynton, W. H., Woods, Gladys M., and Wood, F. W.: Progress in hog cholera control with tissue vaccine. J.A.V.M.A., xc (1937), n. s. 43 (3), pp. 321-325.

suspension of finely-ground virus tissue collected from pigs in the acute stages of cholera infection. The disease-producing properties of the virus tissue are destroyed through the use of eucalyptol, but the immunizing properties of the eucalyptol-treated virus tissue are retained. Due to the fact that hog-cholera tissue vaccine can not produce cholera when injected into susceptible pigs, there is no danger of the spread of the disease from vaccinated to healthy susceptible pigs. Because no reaction follows the administration of the tissue vaccine, pigs suffering from intercurrent infections such as necrotic enteritis or pneumonia, may, as extensive field trials[3] have proved, be treated with this vaccine without danger of aggravating the existing disease condition and thus causing losses exceeding those that would normally occur.

Hog-cholera tissue vaccine is a purely prophylactic immunizing agent requiring a period of at least three weeks in order to induce a satisfactory immunity against cholera. This vaccine has no curative properties, and is of no value whatever when administered to an infected animal; therefore, it should not be used in outbreaks of cholera, since the development of immunity would be too slow to make its use practical for the treatment of infected herds. Anti-hog-cholera serum always should be used whenever cholera infection is suspected.

When the immunization of pigs on a farm is planned, the veterinarian should obtain a history of the herd and determine first whether cholera exists on the farm. If there is evidence of cholera infection, antiserum should be used and the immunization with tissue vaccine postponed. If the administration of the serum checks the infection and the pigs appear healthy at the end of a three-week period of observation, the first injection of vaccine may be given and should be followed in two or more weeks by a second injection. When the history indicates that both herd and premises are clean and free from cholera infection, the vaccine may be administered immediately, and the first dose of vaccine followed by a second injection after an interval of two or more weeks.

For the development of a satisfactory immunity against cholera, the pigs which are to be immunized should have been weaned for at least two weeks before vaccination. This statement is made since it is a well-known fact that it is difficult to produce, uniformly, a solid immunity against cholera in suckling pigs through the administration of tissue vaccine or by any other means of immunization. Two injections of vaccine are advised for immunization purposes and the interval between injections should be at least two weeks. Tests have shown that a single injection of vaccine will render the treated pig immune to inoculation with hog-cholera virus, but since the duration of the immunity afforded by a single injection of vaccine has not been definitely established, the use of a single dose of vaccine should be limited to pigs which will be marketed within three or four months of vaccination. Breeding stock which has been immunized by the tissue-vaccine method should be retreated with one injection of the vaccine yearly.

The dosage of tissue vaccine for pigs of all ages is 5 cc. Weanling pigs are customarily injected in the axillary space or directly into the peritoneal cavity. In heavy hogs injections may be made into the neck muscles.

Following the injection of tissue vaccine, pigs may be handled and fed as usual, since the administration of the vaccine does not cause any appreciable reaction, and it is not necessary to restrict the feed, as is the case following serum and virus treatment.

Aseptic and sanitary precautions must be observed in the handling of pigs during vaccination and following the immunization treatment. Unless one is careful to use suitable precautions during the injection of a vaccine, abscesses may occur. Tincture of iodine has been used successfully as a skin disinfectant, although any suitable disinfecting solution may be employed.

[3]Boynton, W. H., Woods, Gladys M., and Wood, F. W.: Field application of hog cholera tissue vaccine. J.A.V.M.A., xciii (1938), n. s. 46 (5), pp. 291-296.

Instruments and equipment used for the administration of vaccine should be properly sterilized before use and should be handled carefully during the process of vaccination; clothing and other materials which may have been employed for serum-virus immunization should not be used under any circumstances for the administration of hog-cholera tissue vaccine to susceptible pigs, unless such equipment and clothing are previously cleaned thoroughly and sterilized. This advice is given because a period of at least three weeks is required for the development of a satisfactory immunity following the administration of tissue vaccine, and if pigs are exposed within this period to clothing and equipment contaminated with virus, losses may be expected.

Hog-cholera virus is probably the best selector of healthy pigs known for when this product is administered, with serum, for the immunization of pigs against cholera, the serum-virus treated pigs will, if suffering from intercurrent infection, react severely and many may die. The administration of virus appears to reduce the resistance of pigs so that intercurrent infections are given a chance to develop and progress to fatal termination in most instances. In the same manner, if pigs harboring infections like enteritis or infectious pneumonia are immunized against cholera with tissue vaccine and later exposed to hog-cholera-virus infection, they may react severely and some of them may die. Whether these severe reactions are due to a failure of the animal tissues to respond properly to immunization when intercurrent infections are present at the time of immunization, or whether the virus reactivates the latent intercurrent infections and causes them to develop in spite of the increased resistance to hog-cholera infection conferred by vaccination, is a point which has not been determined. Veterinarians experienced in hog-cholera work recognize that fact that immunity, however induced, may break down under certain conditions.

The immunization of hogs against cholera infection does not, of course, prevent the occurrence of losses from other diseases of swine, and it is an important duty of the veterinarian to suggest to hog owners that the elimination of unhealthy or poor-producing sows should be economical and helpful. The isolation or destruction of sick pigs should be encouraged and healthy pigs should be placed on clean pasture. Filthy wallows and other reservoirs of infection and parasitic infestation should be eliminated if possible, and the swine husbandman encouraged to maintain his animals in a healthy, sanitary state.

The diagnosis of hog cholera on the premises is not always an easy task, and care and experience are required in making a differential diagnosis of this disease. Symptoms and lesions found in sick pigs are often misleading, and one should always inquire carefully into the history of a herd and take the history into consideration before arriving at a probable diagnosis. Laboratory methods for diagnosis of cholera, although dependable, are expensive and slow, so that the field veterinarian is usually confronted on the spot with the problem of outlining to the owner a safe plan of procedure.

This plan is based on the conditions encountered and these, roughly speaking, fall into six classes: 1) pigs on cholera-free premises and under sanitary surroundings; 2) pigs on cholera-free premises but under unsanitary surroundings; 3) home-bred pigs and recently purchased pigs on cholera-free premises; 4) pigs on cholera-infected premises; 5) garbage-fed pigs; 6) feedlot pigs purchased from all sources, and pigs purchased from community and coöperative auction sales yards.

In the first class, pigs raised on cholera-free premises, under sanitary surroundings and intelligent husbandry and without contact with feeder pigs brought in from outside, are generally healthy and the most fitting subjects for immunization with tissue vaccine, just as they are with the serum-virus method. After they are weaned, such animals may be vaccinated without delay and two doses of vaccine should be given at intervals of two or more weeks.

Pigs of the second class, on cholera-free

premises and without contact with feeders from outside, but raised under unsanitary surroundings and unintelligent husbandry, are frequently afflicted with Pasteurella, *Salmonella suipestifer* or verminous infestations. They may, however, if no suspicion of cholera exists, be vaccinated immediately as in the case of healthy pigs and should be given two doses of vaccine in the same manner. At the same time the veterinarian should thoroughly instruct the owner of the herd in the rules of sanitation and husbandry.

Pigs of the third class include feeders as well as home-bred pigs. The newly purchased feeders should be segregated from the home herd for two or, preferably, three weeks to prevent the useless vaccination of feeders which may have been already exposed to or infected with cholera, and to prevent any infection which may be latent in them from spreading to the animals of pre-vaccination age in the home herd and contaminating clean premises. If after this period of observation no evidence of cholera is found, pigs under 50 lb. in weight should be vaccinated in two doses. For feeder pigs which are expected to reach market size within three or four months, one dose of tissue vaccine is sufficient.

In the fourth class, unimmunized pigs on cholera-infected or suspected premises should first be given the maximum dose of anti-hog-cholera serum only, since this product is, without doubt, the most efficient, immediately effective safeguard against cholera known. After the period of passive immunity conferred by this product has passed, namely in three or four weeks, the animals may, if they appear to be free from cholera, be given a lasting immunity by the regular two injections of vaccine two or more weeks apart.

Pigs in the fifth class, that is, garbage-fed pigs, have been vaccinated in too few numbers to justify recommendation of the use of tissue vaccine as yet for other than experimental use. Some encouraging results have been obtained by giving one injection of vaccine before the pigs were weaned and two injections at two-week intervals after weaning. Promising results have been obtained by injecting one dose just before weaning and a second dose two weeks after weaning. The latter procedure, however, is not at all advisable, until it shall have been confirmed by further trials.

Pigs of the sixth class, which consists of feedlot pigs purchased from all sources, and pigs bought at community and coöperative auction sales yards, are not subjects for immunization with this vaccine, unless the purchaser is able to hold them under observation for a period long enough to determine their freedom from cholera.

In the manner thus summarized, immunity can be produced without the introduction of active virus upon the premises and, therefore, without the consequent risks of losses from serum-virus reactions and of setting up new foci of infection.

That tissue vaccine is an adequate and safe immunizing agent against cholera has been amply demonstrated. The continuance of its success depends upon the veterinarian's recognition of its limitations, his alertness in differential diagnosis, and his careful adherence to the conditions here laid down for its use.

Veterinarians in Modern War

Already the European war is taking a heavy toll in animals struck with disease because of the inevitable breakdown of the orderly programs of animal-disease control which even in times of peace may be overwhelmed by sweeping contagions. "German and French veterinarians," says an Associated Press dispatch, are coöperating in stamping out epidemics [epizoötics] threatening to ravage the live stock of France."

At no time in the history of this civilization has the importance of domestic animals attracted as much attention in political circles as during the present international conflict nor has the application of veterinary science ever been as highly appraised as a wartime measure. The veterinary profession is being marked as the essential factor in the production of food in quantities sufficient to prevent defeat.

Sulfapyridine in the Treatment of Calf Diphtheria*

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CALF DIPHTHERIA is an ill-defined clinical entity. Hutyra and Marek[1] state, "Calf diphtheria consists of a diphtheroid necrosis of the buccal and pharyngeal mucosa caused by the necrosis bacillus and is usually fatal as a result of the development of pneumonia or general septic infection." No reference is made to the two distinct clinical forms of the disease: that which affects the oral and pharyngeal cavities and that which affects only the laryngeal cavity. Occasionally the two forms may exist simultaneously. Udall[2] describes only the laryngeal form, using the term necrotic stomatitis to indicate the oral type. This term, however, is confused by his use of the term "calf diphtheria" as a synonym for "necrotic stomatitis." In the Rocky Mountain region, where necrotic stomatitis and true calf diphtheria are prevalent, the term "calf diphtheria" is accepted as that indicating the laryngeal type of the disease.

Furthermore the term "calf diphtheria" conveys the impression that this condition is confined to calves. Many cases are observed in feeder cattle and some in pastured animals up to 2 years of age. Occasionally the affection is seen in older animals. There is a high incidence in animals 6 to 15 months of age, and particularly in yearling feeders. Udall[2] states "It is observed only occasionally in the United States."

The situation is dissimilar to that implied by Udall's statement. In the Rocky Mountain region the disease is particularly prevalent throughout the winter and spring months and causes a serious economic loss to both the dairy and the beef-cattle industries. There has been a noticeable gradual increase of calf diphtheria in the West from year to year.

Although calf diphtheria has been attributed to *Actinomyces necrophorus*, there is reason to view this organism as the sole specific causative agent with some skepticism. It is true that *A. necrophorus* is present in the lesions; nevertheless, other organisms are found in abundance. The question might well be raised, is *A. necrophorus* the initial primary invader or is it an opportunist? The fact that it will infect laboratory animals by subcutaneous or intravenous inoculation does not prove that it is the initial causative bacterium in natural infections of larger animals. The entire question of necrophorus infection is a challenge to the bacteriologist and research worker.

Treatment of calf diphtheria, both local and systemic, has consisted of every known means of combating and eliminating the infection. The majority of cases have been treated by curettage with the use of a laryngoscope. Because of the inaccessibility of the lesion, often being posterior to the vocal cord, or in the shallow laryngeal ventricles, satisfactory curettage is frequently difficult or impossible. Curettage is followed with applications of tincture of iodine, iodine and glycerin, salicylic acid in alcohol, tincture of merthiolate, and other agents applicable frequently.

Other forms of local treatment consist of tracheal intubation, particularly when dyspnea is acute, combined with the methods just described. In small calves the presence of the thymus offers a serious obstacle to the use of the trachea tube. When the trachea tube is used, necrotic lesions invariably develop in the tracheal mucosa surrounding the surgical wound. Repeated use of the laryngoscope frequently traumatizes tissues in the mouth and pharynx, so

*From the veterinary division of Colorado State College. Material was made available for study through coöperation with Merck & Co., Inc., Veterinary Specialties Department.

†On a short leave of absence from Colorado State College to carry on special work in surgery at The Mayo Foundation, Rochester, Minn.

[1]Hutyra, F., Marek, J., and Manninger, R.: Pathology and Therapeutics of the Diseases of Domestic Animals (Alexander Eger, Chicago, 1938), I, p. 496.

[2]Udall, D. H.: The Practice of Veterinary Medicine (3rd ed., D. H. Udall, Ithaca, 1939), p. 20.

that additional necrotic ulcers develop within a period of 24 hours.

Necessary handling of the tongue in treatment devitalizes the mucosa so that it too frequently succumbs to the process of ulceration. Laryngotomy, in the larger steers and heifers, has given slightly more encouraging results. Systemic treatment has consisted of parenteral use of a physiological solution of sodium chloride to overcome the dehydration. Other auxiliary treatments consist of blood transfusions, oral administration of potassium iodide, sodium iodide intravenously, neoprontosil and sulfanilamide. Favorable response to one or a combination of these treatments has been discouraging because of the associated high mortality. Sulfanilamide exerts no apparent therapeutic effectiveness in necrophorus infections in our experience. Therefore, the use of sulfapyridine was resorted to in an effort to evaluate it in the treatment of calf diphtheria.

PROCEDURE

Nine animals, eight of which were Herefords and one a Holstein, diagnosed clinically as infected with *A. necrophorus*, were treated with sulfapyridine. The youngest treated was a 6-day-old Hereford bull calf that was nursing its mother. The other calf was a pail-fed 3-week-old Holstein bull. The oldest was a Hereford heifer 2½ years of age. The ages of the others ranged from 6 to 18 months and they were either in the fattening lots or were being carried through the spring on a growing ration.

Of the nine cases reported, eight showed laryngeal lesions without complications and the ninth was affected with necrotic vaginitis. The clinical diagnosis was confirmed in eight cases by finding the typical lesion with the aid of a laryngoscope, the other with the use of a vaginal speculum. Confirmatory laboratory diagnosis was omitted in all but two cases because of the difficulty and time that would have been involved if attempts had been made to isolate the necrophorus organism from other bacteria likely to have been present. This report comprises nine consecutive uncomplicated cases of necrophorus infection in the bovine species and the clinical record of each animal has been carefully studied.

In order to arrive at a just appreciation as to the therapeutic effectiveness of sulfapyridine in the treatment of calf diphtheria, comparison has been made with nine similar clinical cases treated by other methods. The controls were not selected at random, but were encountered immediately before the animals that received sulfapyridine. In general, this group corresponded in breed and age to the group treated with sulfapyridine. Cases suffering from complications, such as oral, gastric, hepatic or pulmonary lesions, have been omitted to give an impartial comparison.

Of the nine animals treated with sulfapyridine, six were hospitalized and three were treated on the premises of the owner. Of those hospitalized, temperatures were recorded and blood counts made on admission. Animals 1, 2, 4, 5 and 6 were weighed. The weights of the others were estimated because certain factors made it impossible to weigh them before treatment was started.

Sulfapyridine Therapy.—Treatment was initiated in all cases with a 5 per cent solution of sulfapyridine sodium administered intravenously. The dosage was calculated on the basis of .06 Gm. per kilogram (2.2 lb.) of body weight with the exception of Nos. 3 and 7.* Supportive treatment consisted of the immediate oral administration of sulfapyridine on the basis of 1 gr. per pound of body weight, over a period of 24 hours, with the exception of Nos. 3, 4, 6, 7 and 9. Animal 4 received 1.5 gr. per pound of body weight. Nos. 3, 7 and 9 were not hospitalized. On account of this fact, we had to depend upon the owners for the oral administration of the drug for the animals that were not hospitalized.

The daily dosage of the drug given to the hospitalized animals was divided into three doses administered during the daylight hours. This dosage was usually continued for three to four days, at the end of

*1, 3 and 7 received .03 Gm. per pound of body weight.

Summary of nine cases of clinical Actinomyces necrophorus infections in cattle treated with sulfapyridine.

Clinical Diagnosis	Wt. of Animal (Lb.)	Sulfapyridine*		Oral Administration 3 Times a Day	Initial Blood Concentration (Mg. %)	Initial Temperature (F.)	Hrs. Required for Temperature to Become Normal	No. of Days Treated	Results
		Initial Dose Sodium Salt Intravenously	Subsequent Dosage Orally Every 4 Hrs.						
1) Calf diphtheria; larynx	120	3.25 Gm. 49 gr.	1.33 Gm. 20 gr.	Not done	8.0	104.8	12	7	Recovery
2) Calf diphtheria; larynx	85	2.32 Gm. 35 gr.	1.0 Gm. 15 gr.	Not done	6.7	105.0	12	6	Recovery
3) Calf diphtheria; larynx	350	10.5 Gm. 157.5 gr.	Not done	8.0 Gm. 120.0 gr.	7.0	105.2	16?	6	Recovery
4) Calf diphtheria; larynx	820	25 Gm. 375 gr.	136.6 Gm. 205 gr.	1½ grs. per lb. of body weight	14.6	105.1	12	8	Recovery
5) Calf diphtheria; larynx	595	16.5 Gm. 247.5 gr.	6.66 Gm. 100 gr.	Not done	6.7	105.0	8	7	Recovery
6) Calf diphtheria; larynx	640	17.5 Gm. 262.5 gr.	Intravenous sulfapyridine sodium substituted; 10.5 Gm. every 8 hrs.		8.0	103.6	12	3½	Relapse after 70 days; slaughtered; paralaryngeal abscess
7) Calf diphtheria; larynx	600	18.0 Gm. 270 gr.	Not done	13.33 Gm. 200 gr.	7.4	105.2	12	6	Recovery
8) Calf diphtheria; larynx	450	12.25 Gm. 184 gr.	5.0 Gm. 77 gr.	Not done	7.6	105.8	12	5	Recovery
9) Necrotic vaginitis	850	27.5 Gm. 412.5 gr.	Not done	20 Gm. 300 gr.	7.2	104.6	24?	3	Recovery

*Dosage is shown in both metric and apothecaries system.

which the dosage was reduced to one half of the original amount for two or three days. This method of administration was deemed advisable in order that an effective blood concentration of the drug would be established immediately. The concentrations of sulfapyridine in the blood were determined every four hours beginning 10 to 20 minutes following the initial dose of sulfapyridine sodium. The initial blood concentration of sulfapyridine in all cases was fairly uniform, varying from 6.7 mg. to 8 mg. per cent, except in animal 4. In this animal the initial blood concentration was 14.6 mg. per cent. However, the concentration dropped to 6.5 mg. per cent in four hours. After eight hours there was some variation in the blood concentration of all the animals.

Results

A drop in temperature occurred with dramatic suddenness in every case. The average time required for the temperature to return to normal was twelve hours. Since animals 3 and 9 were not hospitalized, their temperatures were not recorded until 16 and 24 hours, respectively, after treatment was instituted. In case 5, the temperature returned to normal in the short time of eight hours.

Other responses to sulfapyridine therapy were equally as striking. The appetite, as a rule, returned in 24 hours. Dyspnea and cough are noticeably relieved in 8 to 24 hours. Protrusion of the tongue and mouth breathing ceased. Increased respiration generally continued for several days, but was not labored, and gradually returned to normal after one to two weeks. Increased nasal discharge was noticed during the first two days of treatment. Elimination of sulfapyridine became quite noticeable by the presence of a white sedi-

ment covering the preputial tuft in the bull, and the vulvar tuft in the female.

Local treatment of the ulcerated areas was omitted in all cases, except animal 1, in which partial curettage of the laryngeal ulcer was performed. No differences were noted in the progress of this case from that of the others.

Animal 3 deserves special comment. This bull had been shipped from Texas three weeks previous to the time that first symptoms were observed. Oddly, the initial blood concentration of sulfapyridine was 14.6 mg. per cent. This rapidly dropped, however, to 6.5 mg. per cent in four hours. Instead of the usual dosage this animal received 1.5 gr. per pound of body weight because of the hyperacute condition. On the second day the animal showed uneasiness and evidence of abdominal pain. Switching of the base of the tail was almost constant, similar to that associated with urethral calculi. This was accompanied by hematuria. The dose of sulfapyridine was reduced to one half of the original amount, and administered in two eight-hour intervals. With continued hematuria and no evidence of the relief of pain, sulfapyridine was discontinued and large amounts of fluid were given.

After three days the urine again became normal, appetite was good, respiration and temperature were normal and the animal was considered ready for dismissal. Eight days later, however, this bull had a relapse, characterized by a temperature of 105° F., loss of appetite, general depression and pronounced dyspnea. Intravenous sulfapyridine therapy was resorted to. The drug was administered every 24 hours for five days, after which complete recovery was evident although the blood concentration of sulfapyridine seemed inadequate. One month after dismissal, the owner informed us that this animal was gaining in weight and appeared normal.

Animal 6 made a rapid recovery and was dismissed on the fourth day. It was returned to the feedlot and continued to gain in growth and in weight. However, 70 days following treatment dyspnea was again noted. Examination revealed no depression, a good appetite, and the temperature was normal. No treatment was given and it was decided to send this animal to slaughter. Autopsy revealed a paralaryngeal abscess lateral to the original lesion with a small sinus tract into the laryngeal cavity. Laboratory cultures were made and it was found that *A. necrophorus* were mixed with streptococci and staphylococci. In this instance one feels justified in offering the opinion that the original course of sulfapyridine therapy was too abbreviated to fully overcome the original infection. In this particular case treatment was modified so that sulfapyridine sodium was administered every ten hours intravenously, as a consequence of which the blood concentration dropped at times below an adequate therapeutic level.

Another case that deserves special mention is No. 9. Necrotic vaginitis developed following calving. The entire vulva and the vagina were a necrotic mass. Straining was so severe that prolapse of the vagina occurred. This was followed by prolapse of the rectum. Depression was pronounced with complete loss of appetite, accompanied by all of the constitutional symptoms associated with this condition. Regardless of the fact that the owner neglected on several occasions to administer the sulfapyridine at the proper time, the animal made a complete recovery. Her temperature dropped to normal in 24 hours, straining ceased, and her appetite returned to normal. Only two observations on the blood concentration were recorded: one immediately after the intravenous administration of sulfapyridine sodium, which was 7.2 mg. per cent, and the other 48 hours later, which was 5.7 mg. per cent. In the past, this form of necrophorus infection has usually failed to react favorably to treatment.

COMMENT

A study of the clinical picture in conjunction with the blood levels leads to the conclusion that the therapeutic effectiveness of sulfapyridine is accomplished by attaining and maintaining a blood level of at least 5 mg. per cent for the duration of treatment. This blood level can be accom-

plished by giving initially either .06 Gm. per kilogram or .03 Gm. per pound of body weight of sulfapyridine sodium, intravenously, supported by oral administration of the drug every four hours, so that 1 gr. per pound of body weight is given over a period of 24 hours. After three or four days this can be reduced to one half of the original amount for three or four days. Half doses at this time will maintain an effective therapeutic level. With more experience in the use of this drug, this figure may be altered. It is of paramount importance to establish an effective blood concentration of the drug as quickly as possible. Sulfapyridine sodium, therefore, should be given intravenously as the initial dose.

In the cases comprising this report the blood concentration of sulfapyridine in all instances dropped rapidly after the initial dose. For from 16 to 44 hours, this continued to remain slightly below the desired concentration, until finally a more uniform blood level was attained. We have observed in our work with sulfapyridine that there appears to be an individual as well as a species variation as to its absorption and elimination. This also was noted by Long and Bliss,[3] who stated, "The irregularity of absorption of sulfapyridine as noted in different patients has made it difficult to establish a rational system of dosage."

It has been noted that absorption of sulfapyridine, administered orally in the bovine species, is delayed when the absorption rate is compared with that of other species. Undoubtedly this is due to the compound stomach of the ox. It is believed that when chemotherapeutic agents are administered orally to the ox, certain amounts must be deposited in the rumen and be subject to delayed and sporadic absorption.

The use of sulfapyridine is not without danger, and careful watch should be maintained for evidence of toxic manifestations. Attention has been called to one animal in this series which developed hematuria during the course of treatment. It is not improbable that this developed as a result of the sulfapyridine. As reported in rabbits and monkeys acetyl sulfapyridine calculi may be formed which might cause serious obstruction and possibly permanent renal damage. This fact is important to keep in mind since in the western part of the United States there is a relatively high incidence of urethral calculi. The small urethra of the bull and steer would make it possible for complete obstruction of the urethra from the accumulation of these calculi. Leucopenia has not been observed in any of the animals treated to date.

While nine cases are not sufficient from which to draw definite conclusions, it is hoped that additional cases can be studied in the future. It is also hoped that if the use of sulfapyridine continues to evidence marked therapeutic effectiveness in calf diphtheria, it will lend encouragement to its use on other necrophorus infections, such as panaritium, foul claw and necrotic hepatitis, and perhaps to similar infections in other species.

SUMMARY AND CONCLUSIONS

Eight cases of calf diphtheria and one case of vaginitis clinically diagnosed as infections due to *Actinomyces necrophorus* were treated with sulfapyridine.

The initial treatment by intravenous inoculation of .06 Gm. per kilogram (2.2 lb.) of body weight resulted in a blood concentration of 6.7 to 8 mg. per cent of sulfapyridine. For continued therapeutic effectiveness this was followed by the oral administration of 1 gr. per pound of body weight.

Twenty-four hours after treatment was initiated, a marked improvement was noted in all cases. After an average duration of treatment for six days all animals were apparently normal. In only one case was there a relapse. In this instance the recommended administration of the drug was not followed. The meager data suggest the use of sulfapyridine in the treatment of calf diphtheria and perhaps in other in-

[3]Long, P. H., and Bliss, E. A.: The Clinical and Experimental Use of Sulfanilamide, Sulfapyridine and Allied Compounds (The Macmillan Co., New York, 1939), pp. 228-231.

A Note on Phenothiazine Therapy in Sheep*

J. H. WHITLOCK, D.V.M., M.S., and RUFUS COX, B.S., M.S.
Manhattan, Kan.

THE PUBLICITY given phenothiazine as an anthelmintic for roundworms in sheep in recent months suggested its use in the flock at Kansas State College, which had a few lambs heavily infected with strongyline nemas (chiefly stomach and nodule worms). The level of infection in the different lambs was determined by Gordon and Whitlock's[1] modification of the Stoll egg count, which determines the comparative worm burden in an animal's intestine by the numbers of worm eggs in the feces. With this technic, a 10-Gm. sample of feces and proportionately more diluent than was originally recommended was used. In addition, a calibrated pipette and an uncalibrated glass chamber were used to measure and examine the .15-cc. samples instead of a calibrated glass chamber. Only one fecal sample was taken to determine each E.P.G. (= eggs per gram of feces), but three subsample counts were made of each fecal sample, and the figure given represents the average.

TABLE I

SHEEP No.	E. P. G.* 7-31-40	TREATMENT 8-1-40	E. P. G. 8-5-40	TREATMENT 8-9-40	E. P. G. 8-17-40
1	1,200	None	1,120	None	320
2	12,300	None	13,720	Phenothiazine, 112 cc.	520
3	80,400	Phenothiazine, 105 cc.	600	None	132
4	2,520	None	8,400	Phenothiazine, 75 cc.	132
5	2,600	$CuSO_4$ sol., 30 cc.	1,200	None	660
6	4,600	Phenothiazine, 75 cc.	520	None	860
7	400	None	660	None	60
8	860	None	920	None	200
9	21,060	$CuSO_4$ sol., 22.5 cc.	2,720	None	1,972

*Only strongyline nema eggs were counted. Note: An E.P.G. count below 2,000 in sheep is considered to indicate a nonpathogenic infection.

Table I gives the data from this test. The copper sulfate solution is that recommended by Mönnig[2] —1.7 per cent $CuSO_4$ and 1.7 per cent nicotine sulfate solution (40 per cent). The phenothiazine solution is that recommended by Singer and Baker[3]: 10 Gm. phenothiazine, .5 Gm. powdered acacia, water q.s. 30 cc.

The dose is .5 gm. (7.7 gr.) per pound of body weight. Preliminary to the administration of each drug the back of the mouth of the lamb was sprayed with 2.5 cc. of 10 per cent $CuSO_4$. The animals

(*Continued from preceding page*)

fections due to or associated with *A. necrophorus.*

At the time this report is being prepared, four months have elapsed since the last of the animals was treated. The recovery has been complete and there is every reason to believe that it will be permanent.

*Contribution No. 85, Department of Veterinary Medicine, and No. 140, Department of Animal Husbandry, Kansas State College.

[1]Gordon, H. McL., and Whitlock, H. V.: A new technic for counting nematode eggs in sheep feces. Australian Counc. Sci. & Ind. Res. J., xii (1939), pp. 50-52.

[2]Mönnig, H. O.: On the toxicity of nicotine for sheep and the use of the nicotine-bluestone drench for worms in ruminants. Rev. de Med. Trop. y Para. Bact. Clin. y Lab., iii (1937), pp. 3-10.

[3]Singer, A. J., and Baker, D. W.: Phenothiazine as an anthelmintic for intestinal nematode parasitisms in sheep. Cornell Vet., xxx (1940), pp. 375-382.

were kept on full feed throughout the experiment.

The data in table I show that the single dose of phenothiazine reduced the E.P.G. count to a harmless level in all cases. This was confirmed by the clinical improvement of the infected sheep. Worthy of note is the fact that under the same conditions the copper sulfate-nicotine sulfate solution failed to reduce the E.P.G. count in one animal (No. 9) to a nonsignificant level.

This case is reported chiefly because it suggests a reason for the low efficacy of phenothiazine solution in heavily infected animals reported by Singer and Baker. In heavily parasitized animals, as Mönnig has pointed out, the esophageal groove reflex is weakened; likewise, practical experience indicates that rumination is retarded. Therefore, after the administration of the phenothiazine solution to heavily parasitized sheep it seemed likely that the drug was partially immobilized in the rumen and prevented from reaching its most effective concentration in the abomasum and intestine.

Such immobilization was prevented in the present test by the use of the copper sulfate mouth spray which was devised by Mönnig to assure passage of other anthelmintics directly to the abomasum. The lack of such pretreatment in Singer and Baker's experiments and the lowered efficacy of the drug in treating heavily infected animals seem to be correlated. Hence it is suggested that spraying the back of the oral cavity with 2.5 cc. (1 dr.) of 10 per cent copper sulfate solution prior to the administration of phenothiazine solution to heavily infected sheep finds theoretical justification as well as the support of what little experimental evidence is available.

Far-Reaching Court Decision

The Supreme Court of the State of Washington confirmed the decision of a lower court which assessed damages against a milkman and the dairy company from which he obtained his supply for violation of the local milk ordinance and the common law appertaining to the sale of food unfit for human consumption. The action was brought by a victim of undulant fever alleged to have contracted that disease through milk purchased from his milkman.

The evidence brought out showed that the milk originated on two dairy farms. The owner of one of these farms was made a party to the suit on the ground that his herd was badly infected with brucellosis (called Bang's disease in the court records). Since the evidence was not clear as to which one of the two farms was the cause of the plaintiff's ailment, the defendant milk producer was found not guilty. The two defendants concerned in the distribution of the milk produced on these two farms were, however, found guilty of selling milk that was not fit for food. That the plaintiff's malady was contracted from the milk purchased from his milkman appeared to be convincing, and it was so held by the higher court.

The records of the court contain a review of the testing of these dairy herds under state direction. In the test made of one of these herds in 1936, the reactors were removed and slaughtered. In 1937, from one of these herds containing 57 head, 20 were reactors and four were suspects. In 1938, in the herd of 25 head which showed a lower degree of infection there were three reactors and one suspect. From this official evidence the court did not seem to hesitate to incriminate these herds as the source of the plaintiff's malady.

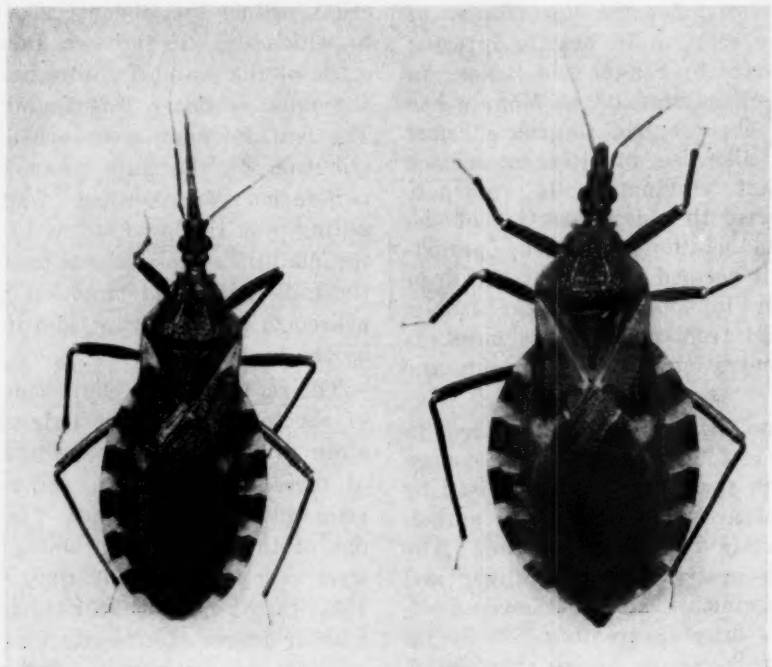
The author contends that in view of the careful review of the facts disclosed and the known relations of animal brucellosis to undulant fever in man, the case may be of far-reaching importance to health officials, veterinary inspectors and livestock sanitarians, since the common law, as well as existing statutes, was invoked.

The case is identified as Harold F. Nelson *vs.* The West Coast Dairy Company *et al*, Supreme Court of the State of Washington. [*Editorial, The Needle, Omaha, fall issue (1940), pp. 6-7.*]

A New Vector of Equine Encephalomyelitis Virus

SINCE the primary isolation of equine encephalomyelitis virus (western type) by Meyer, Haring and Howitt,[1] the exact means by which the virus is communicated to susceptible hosts has remained a mystery. The general belief has been that some blood-sucking insect is involved. Kelser[2] has shown that mosquitoes will transmit the infection under experimental conditions. It has not, however, been possible to isolate the pathogen from mosquitoes or other insects living naturally in areas where equine encephalomyelitis has been rampant. But now Charles H. Kitselman and Albert W. Grundmann[3] of the departments of veterinary medicine and entomology, Kansas State College, may have supplied the "missing link." They report the isolation of the western type of equine encephalomyelitis virus from naturally infected insects—*Triatoma sanguisuga*. In one instance it was possible to transmit the disease by placing susceptible guinea pigs and the insects in the same cage.

Tr. sanguisuga is a blood-sucking insect. In fact, it has a remarkable affinity for mammalian blood, particularly children's. It is commonly known as the assassin bug; in the southern states it is called the big bedbug and the blood-sucking cone-nose. Blatchley[4] states that its length varies from 16 to 21 mm. Another member of the "kissing bug" group, *Tr. protracta*, common in California, is important because of the painful bites it inflicts on humans. Of



—*Cut courtesy Kansas State College.*

Male (left) and female (right) of Triatoma sanguisuga, transmitters in nature of the virus of equine encephalomyelitis.

[1]Meyer, K. F., Haring, C. M., and Howitt, B.: The etiology of epizoötic encephalomyelitis of horses in the San Joaquin Valley, 1930. Sci., lxxiv (1931), pp. 227-228.

[2]Kelser, R. A.: Mosquitoes as vectors of the virus of equine encephalomyelitis. J.A.V.M.A., lxxxii (1933), pp. 767-771.

[3]Kitselman, C. H., and Grundmann, Albert W.: Equine encephalomyelitis virus isolated from naturally infected *Triatoma sanguisuga* LeConte. Tech. Bul. 50 (1940), Kansas Sate College.

[4]Blatchley, W. S.: Heteroptera of Eastern North America (The Nature Publishing Co., Indianapolis, 1926, p. 553).

additional importance is the fact that a number of reduviid species are capable of transmitting Chaga's disease. (See J.A.V.M.A., November 1939, p. 639.)

The authors[3] state that *Tr. sanguisuga* is common throughout Kansas and over much of the region where the horse disease has occurred. According to Blatchley,[4] it ranges from Maryland and New Jersey west to southern Illinois and southwest to Florida, Texas and Panama.

This work of Kitselman and Grundmann, in which they were able to isolate the virus from an insect indigenous to equine encephalomyelitis areas and transmit the infection from naturally infected insects to susceptible guinea pigs, promises to be the greatest forward step in the study of the malady since the development of chick-embryo vaccine.

Journal Complimented

"I am far removed from the institution where I obtained fundamental training in veterinary medicine, but through the medium of the JOURNAL and other magazines I have been able to keep abreast of current advancements and thus maintain a progressive attitude.

"In your recent issue [Aug. 1940, pp. 169-170] I learned of a new technic for preventing flight in birds two days before receiving a call to perform this operation on 50 birds, which paid my membership and subscription many times over.

"To those new graduates who have not had much experience, I strongly advise that if they find "sledding" difficult at first, they would do well to economize elsewhere and rigidly maintain their membership in the AVMA and their subscription to the JOURNAL.

"I thank you for the opportunity to express my appreciation and hope that in the near future I may, through my written experiences, help some member of the profession in a like manner."—*H. Chas. Burns, D.V.M., The Bahamas Humane Society, Nassau, N. P., Bahamas.*

Phenothiazine in Trichomoniasis Vaginalis

The successful use of phenothiazine given orally for a stubborn case of trichomoniasis duly confirmed by microscopic examinations of the vaginal discharges is reported by Poelma and Daniel. (See Oct. 1940 issue, J.A.V.M.A., p. 323.) Those who have tussled in vain with this important breeding problem will agree, with the authors, that others should give this treatment a trial, since studies of this parasitism show not only its high incidence but also its refractory character.

The report is all the more astonishing in pointing to a parenteral action of this somewhat new intestinal parasiticide.

Abdominal Pain in Lung Affections

Veterinarians familiar with the tendency of acute lung affections to cause abdominal pain (colic) during the course of the disease will be interested in recent studies in physiology of the intercostal nerves of dogs* showing that experimental stimulation of the posterior intercostal nerves may cause referred pain in the abdominal organs. Such pain, in the human being, may be so severe as to lead to the performing of an unnecessary appendectomy.

In groups of horses passing through an outbreak of influenza and its allied ailments, the appearance of colic in certain of the affected subjects has been conveniently attributed to "intestinal influenza" when, perhaps, the thoracic localization may be the only cause of the abdominal symptoms.

A new drug of the sulfamide group, named sulfanilguanidine, is announced as a promising treatment of bacillary dysentery. Its microbicide action against the intestinal flora is said to be due to slow absorption. Among the prospective uses of the new chemical is typhoid fever. Credit for the discovery is given to workers in the Johns Hopkins Hospital.

*A. J. Kahn. Studies in Intercostal Nerve Physiology. Proceedings, Society of Experimental Biology and Medicine, xliv (1940), p. 514. Editorial, J.A.M.A., Sept. 28, 1940.

Fluid Therapy in Dogs*

R. L. ANDERES,† B.Sc., D.V.M.
Kansas City, Mo.

VETERINARY literature contains little information about fluid therapy in animals, and many phases of the subject are not understood, particularly the physiology and pathology involved and the requirements of successful treatment.

For the purposes of this discussion fluid therapy is defined as the subcutaneous or intravenous administration of sterile solutions of sodium chloride, Ringer's solution, or glucose solution, etc., or any combination of these agents. The necessity of making up losses of body water and salts is of prime importance to vital function. A starving animal may lose nearly all its glycogen and fat and half its protein, or 40 per cent of its body weight, and still live, whereas the loss of 10 per cent of its water causes serious symptoms of dehydration, and the loss of 20 per cent causes death. From this we can readily see how vital is adequate water for proper body function. Water and salt losses from any cause must be corrected promptly, since these losses may easily result in fatality.

INDICATIONS FOR FLUID THERAPY

The prime purpose of fluid therapy is to replace water and salt, the loss of which is responsible for the symptom or condition we refer to as dehydration. Before speaking of the indications for fluid therapy, let me define "dehydration." A dictionary definition gives a Latin and Greek root, meaning "to take away water"—dehydration is the removal of water from a substance or compound. In clinical medicine we speak of a state of dehydration in an animal when we observe symptoms of diminished turgor of the skin and loss of skin tone, excessive thirst, sunken eyes, fever, poor circulation, concentration of the blood (anhydremia), oliguria, dry mouth and gaunt appearance.

Dehydration may be commonly associated with a toxemia resulting from a number of infectious conditions. Actual blood loss by hemorrhage resulting from accident or surgery may result in dehydration, and the shock complex also may be a cause. By shock I refer particularly to the inability of the animal body to maintain blood circulation and blood pressure, not primarily because of cardiac failure, but, rather, because of decreases in the volume of circulating fluids and the dysfunction of the capillaries. While an inadequate intake of water will produce some of these symptoms, the fully developed picture occurs almost exclusively when, as a result of vomiting, diarrhea, abnormal diuresis (excessive urination), or a severe toxic state, the animal body has lost extracellular electrolytes, or body salts, as well as water. In dehydration the evidences of loss of fluid volume are confined chiefly to extracellular fluid. The central feature is the deficiency of extracellular electrolytes, since dehydration can develop either with or without loss of water from the body as a whole. The major problem of therapy is concerned with the proper restoration of fluids and minerals.

PHYSIOLOGICAL CONSIDERATIONS

For a proper basis of understanding of dehydration let us review for a moment the physiological aspects concerned.

According to Dukes, water represents about two thirds of body weight and 70 per cent or more of the weight of cellular protoplasm. The water intake of the organism includes the water consumed through the ingestion of liquids and solid foods, and the water arising from metabolism, or the digestion of solid food, principally carbohydrates.

Water is eliminated by way of the kidneys, skin, lungs and bowels. A large dog secretes a daily average of one liter (1.05

*Presented at The Ohio State University veterinary conference, Columbus, Ohio, June 12-14, 1940.

†Department of Clinical Medicine, Jensen-Salsbery Laboratories, Inc.

qt.) of water, mostly through the kidneys. This amount varies within a wide daily range depending upon food intake, work, temperature, season, condition of the animal and pathological variations.

The vital functions of water in the body are indeed numerous. It is a necessary part of protoplasm, a medium of transfer of nutrients and removal of wastes, and is concerned in the broad aspect of secretion and excretion. The digestive juices, blood, urine, lymph, cerebrospinal fluid and synovia are largely water. Further, water is concerned in temperature regulation in the body. It is not surprising, therefore, that disturbances of these fluids affect all parts of the body.

Body water may be defined as existing in two separate physiological compartments: intracellular, or water within the body cell, and extracellular, or water outside the cell. Blood plasma, lymph, interstitial fluid and cerebrospinal fluid are principal examples of extracellular fluid. Fluids without and within the cell are in free communication with each other through osmotic cell membranes. Correct proportion of these fluids is maintained by a complicated acid-base balance.

I like to picture the cell as a unit of tissue—a more or less independent unit—as a lily pad, for instance, in the center of a pond of water. In this pond of water are dissolved electrolytes, or salts, in a concentration functionally most favorable for health. It is this fluid, or pond of water, in which we are particularly interested. Any change in the concentration of these salts or amounts of fluid itself directly results in a pathological condition. In health, nutrients are carried to the cell and wastes are carried away. The cell remains throughout its metabolic process as a remarkably stable unit, though forces of osmosis may alter its content. Forces of this type, whether such as to cause withdrawal of water from the cell, or to exert the opposite action, result in cell destruction. Cell destruction can not be repaired by fluid therapy, but only by food.

The extracellular fluids and electrolytes dissolved are not an integral portion of tissue structure, but represent an environment of the cell with the specific function of carriers of nutrients and wastes. The first effect of a demand upon the fluid stores of the body falls upon the extracellular fluid. In vomiting, diarrhea, etc., these fluids are depleted.

The main mineral ion constituents of extracellular fluids are sodium, chloride and bicarbonate. Smaller amounts of magnesium, phosphate and potassium ions are also present. In intracellular fluid the main ions are potassium and magnesium, protein and organic phosphate. It must be remembered that the mineral constituents play a major rôle in dehydration. Dehydration can never be considered as a water-loss syndrome alone.

According to Darrow,[1] human patients having a low sodium concentration in their blood serum show all the classical symptoms of dehydration which disappear when physiological saline is administered. This occurs without water change. Sodium chloride is retained in amounts sufficient to encourage osmosis between the increased intracellular fluid and the inadequate extracellular fluid. The osmosis builds up a normal concentration of extracellular fluid and establishes the proper equilibrium between the two. It is seen by this that dehydration is not alone a water loss, and since extracellular electrolytes exert the osmotic influence just mentioned, treatment of dehydration with water alone or with dextrose solutions is unsuccessful.

Kidney function is disturbed in dehydration because of abnormalities of serum concentration. Water as well as sodium chloride is necessary for restoration of renal function in dehydration.

TREATMENT IN DEHYDRATION

In consideration of the nature of the disturbance in dehydration the general aim of the treatment of all types is the restoration of sodium chloride along with sufficient water to enable the kidneys to adjust extracellular volumes and concentrations. Hypodermoclysis and intravenous infusions

[1]Darrow, D. C.: The treatment of dehydration, acidosis and alkalosis. J.A.M.A., cxiv (Feb. 24, 1940), p. 955.

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Kidney function is disturbed in dehydration because of abnormalities of serum concentration. Water as well as sodium chloride is necessary for restoration of renal function in dehydration.

TREATMENT IN DEHYDRATION

In consideration of the nature of the disturbance in dehydration the general aim of the treatment of all types is the restoration of sodium chloride along with sufficient water to enable the kidneys to adjust extracellular volumes and concentrations. Hypodermoclysis and intravenous infusions

[1]Darrow,, D. C.: The treatment of dehydration, acidosis and alkalosis. J.A.M.A., cxiv (Feb. 24, 1940), p. 655.

of physiological solutions of sodium chloride or its modifications are the most reliable means of replacing extracellular water and electrolytes.

Because of the convenience of preparation, cheapness and availability, physiological solution of sodium chloride will probably continue to be the most frequently used solution in dehydration. Treatment may be carried out by subcutaneous injection, with from 10 to 30 cc. of physiological saline (.9 per cent NaCl) per pound of body weight being used over a 24-hour period, depending on the severity of the dehydration. If symptoms of shock are present, indirect blood transfusion or intravenous injection of blood plasma must be relied upon to prevent dilatation of capillaries and leakage of serum proteins into tissue spaces. Amounts of 1 to 3 cc. of blood serum per pound of body weight also may tend to correct shock symptoms if they have not prevailed for too long. After several hours therapeutic efforts to correct shock are of little avail.

It is worthy of mention that many cases present severe or alarming symptoms within 24 hours after the first sign of illness is observed by the owner. These patients are vomiting or show a profuse diarrhea, or both. Dehydration may seem to have developed overnight. In these cases salt as well as water loss is great and the tendency is to underdose with the physiological solution rather than overdose. It is said that as much as one third of extracellular electrolytes may be lost in marked dehydration. This means a salt loss of 10 to 14 Gm. Thus we can see that it requires a longer time to make up this loss than is usually given for administration. If vomiting or diarrhea continues after treatment for dehydration is begun, it also is evident that salt loss is continuing.

It has been my experience, and that of others, that considerable edema sometimes follows subcutaneous injection of massive doses of physiological saline. Several factors may be at play to cause this symptom. The poor circulation exhibited by dehydrated dogs may be inadequate for the task of absorption; thus the saline gravitates in pockets at low points. A second explanation is that injection of physiological saline may result in a monovalent ion poisoning. The sodium ion, being monovalent, causes a decrease in the inhibition of fluids, with resulting edema. Injections of calcium gluconate will correct this edema and toxicity, which is called by Sollman the "antitoxin action" of ions. The calcium ion constitutes the second or antitoxic salt. The probable action of calcium in this instance is its tendency to increase the permeability of body cells, thus aiding the establishment of tissue circulation. To guard against edema following subcutaneous injections practitioners have employed intravenous infusions, but edema in the extremities may occur also after intravenous administration of large doses of physiological saline. Loch has shown that the infusion of quantities of a single salt, such as sodium chloride, produces a diuresis and glycosuria.

Still another explanation of this edematous process is that of shock. Breakdown of capillaries with resultant circulatory failure and effusion of plasma into tissue spaces occurs. If this breakdown is severe, no effective therapy is available. Thus blood transfusion or injection of blood plasma or serum is recommended. No simple explanation can be given for edema following administration of physiological solutions, as a host of factors appear to be involved.

It must be remembered that the body is a complicated system of osmotic membranes and that the favorable results following administration of fluids for normal functions are only temporary because of the difficulty of keeping these fluids where we want them.

The view is coming into prominence that one should employ, as treatment for dehydration, solutions containing a balance of salts more nearly approaching the molecular ratio found in the blood. Ringer's solution is being used more frequently with success. It possesses the advantage of having a favorable salt balance that lessens the danger of poisoning, toxicity and edema that occasionally follow administration.

The exact composition of Ringer's solution has been varied by different workers but contains sodium chloride, potassium chloride, calcium chloride and sodium bicarbonate. Glucose (.01 per cent) may be added to advantage in Ringer's solution.

For general use it is recommended that Ringer's solution be employed as the infusion fluid of choice, especially in cases where definite symptoms of great salt loss are present, and in cases complicated by severe vomiting. In selected cases physiological solutions of sodium chloride may be preferred, or may be the only solution immediately available. In most cases better results follow the routine use of Ringer's solution.

ADMINISTRATION ROUTES

The best administration route will depend on the condition and tractability of the patient. Personally, I prefer the intravenous method, taking from one-half hour to one hour to give the injection. This is accomplished by the Murphy drip method, which can be adjusted to any desired rate of flow. Effusions must be slow to avoid embarrassment of the circulatory system. The intravenous route is the logical method of medication and there is every reason to expect that it will continue to come into more general use.

The blood possesses a remarkable power of resuming its normal condition. This process of restitution is extremely rapid. If isotonic or hypotonic solutions are introduced, they dilute the blood by their own fluid; if hypertonic solutions are injected, the blood draws fluid from the tissues until it has resumed its original concentration.

In some instances it may be desirable to administer our solution under the skin. Hypodermoclysis is more rapid and gives excellent results if reasonable care is exercised. An important point is to avoid too extreme pressure behind the injection. Gravity flow with an elevated column of approximately 30 in. usually suffices. Frequent change of the needle location also is recommended, or an arrangement of divergent tubes from the main column with an adapter and needle on each is a convenience.

PREPARATION OF SOLUTIONS

Physiological saline, Ringer's solution, dextrose solution and other physiological solutions and combinations are available on the market as sterile solutions ready for use. These need not be heated to body heat and in my experience such solutions are preferably given either slightly cooled or at room temperature. Avoid an overheated solution.

Solutions of these therapeutic agents may be prepared in the clinic by the addition to distilled water of measured quantities of salts in tablet form. It is most important that these be clean and sterile. Such solutions may be filtered through gauze into a clean bottle. The bottle should then be stoppered with a cotton plug and sterilized in a pressure cooker at 20 lb. of pressure for one hour. It will be necessary to allow for approximately 100 cc. (3.3 oz.) of loss in each liter (1.05-qt.) bottle.

Fever and anaphylactic-like reactions have been observed following infusions of physiological solutions. Though these are infrequent, they are serious. Lack of sterility usually accounts for the reaction.

Dextrose solutions provide nourishment of the tissues and also operate as detoxifying agents. They are indicated especially in impending acidosis and in cardiac collapse. Dextrose may be administered in hypertonic solution, but 25 per cent should be the concentration limit for dogs. Most practitioners prefer 5 or 10 per cent solutions given intravenously or with the saline solutions. Approximately 10 Gm. for a 50-lb. dog may be set as a reasonably safe limit for a single dose of dextrose solution.

SUMMARY

I have tried to outline briefly the pertinent points in the physiology of water and salt metabolism in the animal body and to describe the resulting general pathology in water and electrolyte loss. The vital

part played by these elements has been emphasized.

In dehydration, water and salt loss, or salt loss alone, efforts must be made to replace such losses promptly. Successful replacement has been shown to be an involved process.

We can add those elements lost and aid nature to reëstablish a healthful balance. Every vital body organ is in play, especially the kidneys, which carry most of the responsibility of retention and secretion.

Solutions for administration and administration routes have been discussed. No rule-of-thumb direction can be given for relief of the condition of dehydration in every patient. Quantity, kind of solution, route of administration and supplementary treatment will vary in wide range, depending much upon the direct etiology of the dehydration and extent of dehydration exhibited. Clinical evidences of recovery from dehydration and a diuresis containing chlorides may be used as a guide to the extension of treatment.

Horses, Mules and Tractors in Farming

Secretary Wayne Dinsmore of the Horse and Mule Association of America has just released (Sept. 6) a circular on the horse-mule-tractor situation on American farms that is worthy of more than casual reading. It is a document on the trend of horse breeding in various states which prompts one to compliment that association on the work of its intrepid leader. By simply telling unexaggerated truth Dinsmore has maintained the morale of horse and mule breeders for many years in spite of the discouragements which have beset their enterprise through misunderstandings and harmful propaganda.

The falling off of 15 to 25 per cent in the breeding of work horses last year and but a slight increase, here and there, in the production of mules, with increased interest in riding horses, paints the mathematics of the situation. To this may be added a decrease of around 30 per cent in prices for the better types.

A happy trend is the growing (but much delayed) realization by farmers that tractors cause lower prices for hay and grain together with increases in the production of food-producing animals. In other words, the circular states, "Farmers are beginning to realize that lowered prices for farm products are part of tractor costs."

Moreover, Secretary Dinsmore finds evidence to the effect that many who now have tractors are gradually changing their old and inferior horses to excellent young mares and breeding them. There seems to be a tendency toward the use of tractors for belt and emergency field work and teams for as much of the field work as possible. There is, in short, an obvious inclination for farmers to obey the cruel laws of economics, or else——.

The Indications of Vitamin K

With rare exceptions the use of internally administered hemostatic agents is limited to the rapid hemostasia required in surgery and traumatic injury. The hemorrhagic conditions for which vitamin K has been recommended do not often exist in domestic animals. Its action is not rapid enough to be of service in veterinary practice in the light of present knowledge of its dynamics. Even in congenital hemophilia of man, for which it has received some praise, the results are disappointing, and the same is reported for its value in various types of purpura and anemia, or any condition not associated with disturbances in the soluble globulins of the blood. In epistaxis, gastric and duodenal ulcers, colonic hemorrhage and uterine hemorrhage, no benefit is derived. With this group out of the indications along with surgical and accidental bleedings, new facts regarding this addition to the vitamins will have to develop before the use of vitamin K in veterinary practice can be recommended. Our conception of the hepatic troubles for which it seems to be employed in human medicine is too vague to be turned into stated uses.

Livestock Insurance

THE IDEA of insuring live stock on a basis of mutual assistance against death dates back to antiquity. Corporate interest in livestock insurance began about the first third of the 19th century.[1] Interest in this type of insurance in the United States was initiated in 1828, at which time the Northhampton County Horse Association was formed at Butztown, Pa.

After the turn of the present century and up to the early '20s, numerous livestock insurance companies were established. At one time Indiana alone had 13 such companies. With the passing of time, all of the firms established to write this type of insurance except one* failed or were disbanded by mutual agreement, the reason being that the idea was not financially sound.

So today we have only one stock company specializing in livestock insurance, not because the project is a financial success, but rather because this organization is in a position to render a worthwhile service to its clients in conjunction with the writing of other forms of protection.

Livestock transit insurance should not be confused with mortality insurance. Transit insurance is employed to protect in case of accidents, including fire and lightning while animals are in transit. The same applies to insurance which is available for protecting investments while animals are quartered in stockyards, etc. The bulk of the mortality insurance written today involves saddle horses, race horses, polo ponies, hunters, jumpers, harness horses and, to a lesser extent, ordinary farm horses, mules and cattle. It is practically impossible to procure mortality insurance on dogs because of the hazardous risk. Until 1½ years ago, one large firm insured dogs, and even at the prohibitive rate of 17 per cent for males and 22.5 per cent for females, the venture was not successful.

Only about 15 per cent of the race horses are insured. The reason for this is twofold: A high percentage of race horses are not sound, which naturally precludes their insurability, and the moral risk involved is an important factor.

Mortality insurance is a form of term life insurance, never written for a period longer than one year. Claims are payable only upon the death of the insured animals, and contracts may be cancelled at any time.

It is possible to obtain blanket policies for herds of live stock, 30-day policies which are written on broodmares, and floater policies including transportation.

These blanket policies for either purebred or grade dairy and beef cattle are available under annual contracts only, the rate being $3 per $100 of insurance for beef-type cattle, and $3.25 per $100 on the dairy type. These rates represent the cash premium to be paid. A like amount or premium equal to the cash premium paid the insurer is to be deducted from the first losses; otherwise the full liability insurance, without deduction, takes a rate of $6 per $100 of insurance on beef cattle, and $7 per $100 on dairy cattle.

Mortality floater policies provide protection against loss by death resulting directly from disease, accidental injury, fire, lightning and windstorm, including while in transit by rail, ferry transport, or properly equipped motor vehicle. Coverage under general livestock policies may be limited by attaching endorsements restricting the coverage to loss caused by fire, lightning and transportation, or fire, lightning, transportation and accidental death, meaning death resulting from external, accidental and violent means.

Some of the prohibited risks with respect to mortality insurance are wild animals, fur-bearing animals, circus and rodeo animals, contractor-owned horses, mules used for excavating and construction purposes, junk-dealer horses, sheep, goats, hogs, range cattle, horses in public riding clubs that are rented to the public, and jacks.

[1]Kopf, E. W.: Origin, development and practices of the live stock insurance. Casualty Actuarial Society, Proceedings of, xiv, part II (May 25, 1928).

*Hartford Live Stock Insurance Company.

The prevailing livestock insurance rates are as follows:

	Per cent
Saddle horses (Age limit 12 years)	5
Polo ponies, hunters and jumpers (Age limit 12 years)	6
Race horses (Age limit 8 years)	6
Ordinary farm horses and mules	7
With foaling hazard (Mares used for breeding purposes can be insured up to 12 years of age)	8
Trotters and pacers Rate includes transportation	5.5
If one owner insures more than seven head, the rate is	5
Breeding stock (Rate does not include transportation or floater coverage; age limit on stallions and mares is 16 years)	5
Short term (30 days) foaling policy	5

The rate for full mortality coverage on feeding cattle will vary, depending upon the length of time covered. For example, a six-month contract costs $4.50 per $100 of insurance.

The limited coverage policy intended for exhibitors and breeders is based upon the time in force. A policy which protects against death from external, accidental and violent means for a period of three months costs $1.50 per $100. This does not include polo ponies, race horses, etc.

The livestock insurance contract requires that when insured animals are injured or become ill, the owner must solicit immediately the services of a competent licensed graduate veterinarian. Home treatment of insured animals or the employment of charlatans jeopardizes the contract. It is necessary that the agent or someone qualified to do so vouch for the good health and insurable condition of all animals proposed for insurance. Generally the agent makes inspections on ordinary farm animals of nominal value. Applications for insurance on high-priced or very valuable animals, however, must be accompanied by a satisfactory veterinary health certificate issued by a qualified, graduate veterinarian.

Animals are insured only for actual value. Anticipated increases in value are not considered.

In addition to the aforementioned strictly livestock insurance company and the several other insurance firms which write an occasional policy for purposes of accommodation, three mutual livestock insurance firms have been established recently in the states of Louisiana, Mississippi and Arkansas. These companies are operated in conjunction with Farm Security Administration projects in the aforementioned states. In fact, the insurance is available only to 23,000 low-income farm-family clients of the FSA for the protection of mules, other work stock, and sires. The Arkansas and Louisiana associations provide 80 per cent coverage, and the Mississippi, two thirds.

According to Griffin,[2] the Mississippi company has 18,241 clients (1939), 29,374 animals insured, has collected $184,800 in premiums, and has $121,700 in claims paid or pending. During 1939, losses were paid on 5.8 per cent of the animals insured. Excesses of income over losses and needed reserves are to be returned to the membership as patronage dividends.

Thus far the three projects have been successful, that is, the premiums collected have been sufficient to pay the losses and operating expenses. It is important to bear in mind that the past history of livestock insurance in this country is not encouraging, and the provincial scope of the aforementioned is not conducive to success over a period of years. At best, livestock mortality insurance is the most hazardous form of protection written today from the standpoint of the insurer.

Vitamin M, component of liver, is a new antianemic factor discovered by Professor Paul L. Day of the University of Arkansas. Its discovery was announced before the annual meeting of the National Live Stock and Meat Board at Chicago. The value of other meats as a source of this vitamin remains to be determined.—*From Daily Digest, USDA.*

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[2]Griffin, R. A.: Farm Security clients insure live stock. Agricultural Finance Review, iii (1940), pp. 18-23.

CLINICAL DATA

Oligodendroglioma in a Dog*

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AMONG DOMESTIC animals the dog appears to be most susceptible to the common neoplastic diseases. Tumors of the brain, however, are infrequently observed, judging from the paucity of cases reported in the literature. This may be more apparent than real, since comparatively few animals are examined *post mortem*, particularly as far as the central nervous system is concerned.

The most recent compilation of gliomas occurring in animals was made by Jungherr and Wolf[1] in 1939. Their tabulations show 23 brain tumors in dogs reported in the literature. Among these only one case was diagnosed an oligodendroglioma, that by Milks and Olafson.[2] This case, however, was not described histologically. It would appear, therefore, that oligodendroglioma in the dog is an uncommon type of glioma. From a comparative point of view it is of interest that in man the oligodendroglioma also is considered to be among the unusual types of brain tumors. Grinker[3] and Lowenberg and Waggonner[4] reported recently 4 per cent and 5 per cent, respectively, among all gliomas.

REPORT OF CASE

Clinical Observations.—The subject was a 6-year-old male Kerry Blue Terrier which first showed evidence of brain disturbance in February 1939. The brain symptoms were characterized by periodic epileptiform seizures which continued for nearly a year. Repeated physical examinations disclosed no apparent reason for the convulsions. X-ray of the gastrointestinal tract was negative for ulcers. Dietary changes failed to abate the symptoms. The physical condition remained good. At times the dog had a depraved appetite, eating his own stool, and would chew at articles of furniture. He consumed large amounts of water. Shortly before euthanasia the owner stated that the dog recognized no one and none of his old environments, did not respond to commands and was listless and stiff. The pupils were dilated. The prognosis was decidedly unfavorable and the animal was sacrificed for autopsy purposes approximately eleven months after the onset of symptoms. Earlier destruction had

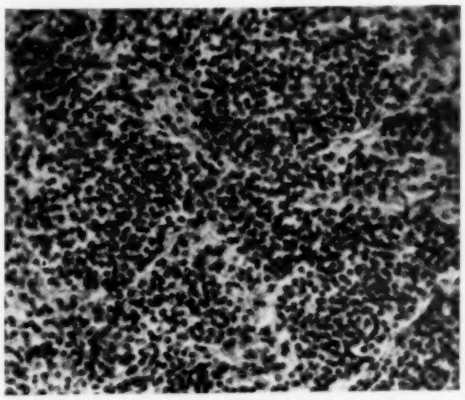

Fig. 1. Typical histological picture of the gelatinous area of the tumor, showing diffuse cellular growth with rather small, round nuclei. Hematoxylin and eosin (x 120).

*From the Branch Pathological Laboratory, Bureau of Animal Industry, U. S. Department of Agriculture, and the Department of Pathology, University of Colorado, School of Medicine and Hospitals.

[1]Jungherr, E., and Wolf, A.: Amer. J. Cancer, xxxvii (Dec. 1939), pp. 493-509.

[2]Milks, H. J., and Olafson, P.: Cornell Vet., xxvi (1936), pp. 159-170.

[3]Grinker, R. R.: Neurology (2nd ed., Charles C. Thomas, Springfield and Baltimore, 1937), p. 527.

[4]Lowenberg, K., and Waggonner, R. W.: Trans. Amer. Neurol. Assn., lxiv (1938), p. 192.

been recommended by the attending veterinarian, who suspected a brain tumor. The owner, however, had insisted on continued treatment.

Gross Findings.—A careful examination of the organs and carcass failed to show any gross pathological alterations. The brain was removed and appeared normal on superficial examination. It was placed in formalin solution and submitted to the laboratory for further study. Examination of the brain substance revealed a roughly outlined, nonencapsulated, oval tumor mass,

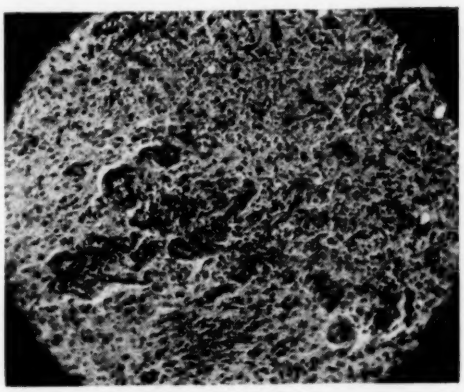

Fig. 2. Section from the peripheral portion of the tumor, showing vascular proliferation (x 90).

measuring about 2 cm. in diameter, situated in the white matter of the left frontal lobe. The center of the growth was soft and gelatinous. The peripheral zone was more solid and contained a number of small hemorrhages. There was no distinct line of demarcation between the neoplasm and the adjacent normal brain substance. The tumor extended to, but did not appear to invade the gray matter of the cerebrum.

Microscopic Findings.—In sections made from the central gelatinous portion, the bulk of the tumor tissue consisted of areas of densely accumulated cells, contained in a scanty plasmatic ground substance (fig. 1). Outlines of the tumor cells were not discerned. The tumor areas were separated by strands of glial tissue. The nuclei were definitely roundish and rather pale in hematoxylin and eosin stain. Most of them contained tiny chromatin particles. Some appeared darker. Mitosis was observed only occasionally. In the very center could be seen a thin, net-like ground substance; the tumor nuclei were in part quite pale, in part small and pyknotic. Small hemorrhages were seen occasionally in this area. Toward the periphery the tumor tissue was somewhat looser, the nuclei being scattered throughout apparently normal tissue. The blastoma thus encroached in places also upon the cortex, which grossly had failed to give the impression of such involvement. This was sometimes accompanied by a spongy condition of the cortical ground tissue with moderate astrocytic proliferation while the bulk of the nervous tissue was rather well preserved. Toward the basal ganglia the growth likewise lacked definite demarcation; in this region an occasional isolated, roundish tumor nodule occurred.

Sections from the peripheral portions of the tumor showed some differences. The bulk of the tumor tissue appeared as described above and, in addition, contained an occasional "fattened" swollen astrocyte. However, several nearly anuclear areas occurred, containing degenerated tumor elements and, especially in the edges, a small number of red and white blood corpuscles, scavenger cells and astrocytes. Multiple small hemorrhages were observed. There was a definite proliferation of endothelial cells of the small vessels in several areas, especially in the tumor periphery. These cells were enlarged and increased in number so as to give many vessels the appearance of almost solid strands with barely visible lumina (fig. 2). While in places the endothelial proliferation seemed to produce a barrier to the spread of the tumor, such tendency to demarcation was entirely lacking elsewhere. In the lower cortex some astrocytic and microglial proliferation surrounding the tumor was noted; an occasional vessel showed pronounced round cell infiltration. Calcification was absent, and formation of box- or basket-like structures surrounding the tumor nuclei—frequently but not always seen in human cases—was not observed.

Van Gieson's stain failed to reveal the presence of collagenic fibers other than in

the vessel walls. Nissl's stain showed occasionally a trace of cytoplasm around the nuclei, with a few short, thin processes. Holzer's stain showed irregular plasmatic glial structures in which the tumor elements were contained but failed to demonstrate the presence of true glial fibers within the blastoma. Penfield's modification of Hortega's oligodendroglia method yielded a good impregnation of the tumor nuclei and occasionally demonstrated small, short, argentophilic processes around tumor cells.

DISCUSSION

The diagnosis of oligodendroglioma in our case was based on the histological similarity to this type of tumor seen in man. The histological features of all other brain tumors are quite dissimilar to the oligodendroglioma.

Clinically our case and that of Milks and Olafson showed several points in common. In both instances the tumor was situated in the anterior portion of the frontal lobe of the cerebral hemisphere, and the foci were quite similar as to shape and size. Both animals were affected with periodic convulsions. In our case the tumor might well be considered a slow-growing neoplasm. Again, from a comparative point of view the oligodendroglioma in man is found in the cerebral hemispheres more often than elsewhere. The tumor grows slowly and occurs more frequently in middle-aged persons and may produce epileptiform seizures.

SUMMARY

An oligodendroglioma of the left cerebral hemisphere in a dog is described.

The histological features on which the diagnosis was based were, among others, the arrangement of tumor cells in diffuse masses, the characteristic shape of the nuclei, scanty cytoplasm, small stubby cell processes seen in silver-stained sections, and vascular proliferation.

The tumor produced symptoms of periodic epileptiform seizures extending over a period of eleven months.

The Diagnosis of Tularemia in Rabbits

In some instances it is not possible for the inspector or vendor of rabbit meat to detect the presence of tularemia. Although whitish tubercle-like spots scattered over the liver, lymph nodes and spleen are characteristic gross lesions, they may be too small to be visible to the unaided eye. A hand lens may be needed to detect their presence and even this instrument may not magnify them into visibility. The muscles and bones of infected rabbits harbor the causal organisms (*Pasteurella tularense*), but these organs show no evidence of its presence macroscopically.

During the open season for rabbits where they are protected against year-around hunting, veterinarians are frequently questioned about how to detect the presence of tularemia when delectable rabbits are brought into the home for culinary use. Butchers who dress and vend them are also curious. The answer is microscopy in the absence of the telltale spots on the surface of the viscera (*vide supra*).

Light Affects Life Cycle of Insects

That light rather than heat can play a part in the cycle of insect life was shown by Carroll N. Smith and Moses M. Cole, federal entomologists working with the American dog-tick carrier of Rocky Mountain fever. By using artificial light and giving the tick the opportunity to attach to laboratory animals, it was shown why the ticks are more active during the long days of May and June and less active in the short days of fall when the temperature is still warm. Hibernation begins in the fall and ends in the spring in obedience to the hours of daylight and regardless of the temperature.

Among the effective treatments of warts in horses and cattle is a 50 per cent aqueous solution of urea injected, not too deeply, around the base. One, and occasionally two, treatments are required. Although some warts rebel, a cure is generally brought about in a week to ten days.

Anaplasmosis Transmitted by Tipping the Horns of Cattle*

LEWIS H. MOE, D.V.M., GEO. W. STILES and D. E. HOWELL

INCREASING evidence shows that the use of unclean instruments in the performance of surgical operations on cattle is a factor in the spread of anaplasmosis. Dehorning is the most common mechanical method of spreading this disease in an infected herd. Anaplasmosis following tipping of the horns is mentioned by Stiles[1] as one method of transmitting the disease. In addition to dehorning, Stiles[2] mentions other means of disseminating anaplasmosis, namely, by drawing blood for Bang's disease, vaccinations, injuries from nose leaders, castrations, slitting the ears for identification, intradermic injections, and other minor surgical operations. Experimentally, Rees[3] transmitted anaplasmosis by lancet pricks from infected to healthy cattle.

HISTORY

April 20 and 21, 1940, a herd of 747 3-year-old grade Braham (zebu) steers were "tipped" before shipment from Lake Charles, La., to Osage county, Okla. Tipping consists in removing a few inches of horn, not the entire appendage, as in dehorning. The clippers used in the process of clipping were not disinfected before or during the operations. Sufficient horn substance was removed to cause bleeding, thus making it possible to transmit infection from blood-contaminated instruments.

These cattle were shipped on April 24 and arrived at their destination on April 26. There was no evidence of anaplasmosis in the herd at the time of shipment or when it arrived in Oklahoma. In view of the later occurrence of anaplasmosis in this group, it is probable that the herd harbored a few carriers, since it is known that anaplasmosis is enzoötic in various sections of Louisiana. A carrier animal is one that has had the disease at some time during its life, but which manifests no visible symptoms after recovery.

The grade Braham steers were among several thousand head of cattle shipped from southern states to northern Oklahoma and the Flint Hills of southern Kansas. The animals were to be held on pasture and shipped to the Kansas City market later in the season.

FIELD OBSERVATIONS

This herd of 747 cattle ranged on an open prairie pasture, practically free from timber, save for a little brush along a small creek. The cattle were reported free from ticks. Horse flies had not yet appeared when the animals were placed on pasture. There was no evidence of anaplasmosis in other herds of cattle in the vicinity. Grass was abundant and plenty of clean water was provided for the animals.

ONSET OF THE DISEASE

The first case of anaplasmosis was noted on June 2, 42 days after the last day of tipping. This incubation period corresponds with that observed by Hilts,[4] who diagnosed anaplasmosis during the winter in a herd of 340 cattle, after dehorning. The essential feature of that outbreak was the death of 13 head. Twenty-two of 35 infected animals recovered.

DIAGNOSIS

Anaplasmosis was diagnosed in the herd of Louisiana origin by microscopic examination of blood smears and clinical observation of the sick animals. They showed

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*This is a coöperative project of the Oklahoma Agricultural Experiment Station and the Bureau of Animal Industry, U. S. Department of Agriculture. Representing the former are Lewis H. Moe, associate professor of veterinary science, and D. E. Howell, assistant professor of medical entomology. The Bureau is represented by Geo. W. Stiles, bacteriologist in charge of the Branch Pathological Laboratory, Denver, Colo.

[1]Stiles, G. W.: Mechanical transmission of anaplasmosis by unclean instruments. No. Amer. Vet., (June 1936), pp. 39-41.

[2]*Ibid.*: Anaplasmosis in cattle. USDA Circ. 154 (Dec. 1939).

[3]Rees, C. W.: Experimental transmission of bovine anaplasmosis and piroplasmosis by means of an infected lancet. No. Amer. Vet., xi (Oct. 1930), pp. 17-20.

[4]Hilts, W. H.: Anaplasmosis in cattle following dehorning. Cornell Vet., xviii (Oct. 1938), p. 330.

jaundice, loss of appetite, anemia, debility and other symptoms typical of the disease.

RESULTS FROM TIPPING

There were 16 cases of anaplasmosis in this herd of Braham cattle and three died from the disease. The last case appeared on June 17. The recovered animals were shipped to market for slaughter to eliminate known carriers from the herd.

DISCUSSION

This brief article is prepared to emphasize further the possible danger arising from the use of unclean instruments on cattle, where anaplasmosis may be transmitted from carrier to healthy animals. In cases of the type herein described, man is wholly responsible for spreading the disease because proper sanitary precautions are not observed.

PRECAUTIONS NECESSARY

All saws, clippers, needles, knives and other instruments used in performing operations should be washed in clean water and immersed in disinfectant solutions. Before use, and between operations on individual animals, all instruments should be briefly boiled in soda water, or placed in freshly prepared 2 per cent lye solution, or other disinfectant, to render them safe. Other solutions considered suitable are 3 per cent compound solution of cresol, 2 per cent formalin, or 70 per cent alcohol.

SUMMARY

From a herd of 747 grade Braham steers, 16 head developed anaplasmosis following tipping of their horns. Three of these animals died. The first case appeared 42 days after the operation.

For a 500-pound steer affected with hemorrhagic septicemia, 90 grains of sulfanilamide every six hours is an excellent treatment.—*O'Neal.*

The old saying about horses "feeling their oats" could be revised to "feeling their thiamin," or is E the vitamin that won distinction for oats as a horse feed?

Lead Poisoning in Guinea Fowl

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Philadelphia, Pa.

DURING the summer of 1940, the author had occasion to perform an autopsy on a guinea fowl brought to the laboratory for diagnosis. The owner, a farmer living near Philadelphia, reported that a number of his flock were affected similarly to the one offered for examination. He described symptoms of leg weakness or paralysis of one leg.

On examination the bird was fairly well nourished and the gross appearance of the organs was normal. When the intestine was opened, contents were found to be bright green and there was only slight inflammation. The gall bladder was distended. Examination of the gizzard showed the lining to be green and the contents tinged with green. A study of the gizzard contents revealed 25 shot, many having been eroded flat on one side. Other fragments of shot were so completely eroded as to be unrecognizable, but appeared to be dark fragments of grit.

Another bird requested for postmortem examination exhibited slight lameness. Blood smears showed what appeared to be stippling. Two fair-sized shot and a few very small pieces were found in the slightly greenish gizzard content of this bird.

Lead poisoning in wild waterfowl is recognized as a hazard to these birds by workers in the field of wildlife conservation. A fairly complete report of this is given by Alexander Wetmore in U. S. Department of Agriculture Bulletin No. 793, issued July 13, 1919. Upland game birds and domestic chickens are not ordinarily exposed to the concentration of shot found in good duck marshes where extensive shooting is practiced.

Inquiry brought out the fact that on the premises on which these guinea fowls originated, considerable shooting at rats had taken place. The extent of this shooting was not determined, but the results indicate a heretofore unreported hazard to poultry.

Vibrionic Abortion in Michigan Sheep*

J. F. RYFF, D.V.M.

East Lansing, Mich.

ABORTION in sheep attributed to *Vibrio fetus* has not been commonly recognized in the United States, but has been reported in New York,[1, 2] Illinois[3] and Montana.[4] The purpose of this paper is to report *V. fetus* as the causative agent of abortion in three flocks of sheep in Michigan within the past year.

March 13, 1940, the Department of Pathology of Michigan State College received an eight-day premature lamb from a flock of 109 ewes in which 14 abortions had been recorded. Mr. E. S. Conklin isolated a vibrio but identification was not carried beyond microscopic examination.

March 25, 1940, Dr. L. B. Sholl of the Department of Pathology again made a diagnosis of *V. fetus* infection in a flock where six lambs had been aborted. Three days later another aborted lamb from the same flock was autopsied, and a similar diagnosis made.

May 19, 1940, four aborted lambs were submitted to the Department of Bacteriology to determine the cause of abortion. Since February 21, 20 consecutive cases of abortions, still births, or weak lambs, living only a few days, had been recorded in this flock of 79 sheep. A few of the aborted lambs were very premature, but in most cases pregnancy had been terminated in its later stages. Some of the later lambs, while not visibly premature, were weak and did not live more than three or four days. As the normal lambing season appeared, fewer abortions were noted and normal births predominated. At least 37 lambs, from 25 ewes, were lost, although no fatalities were encountered in the ewes.

In conjunction with Dr. E. E. Hamann of the Central Brucella Station, the four lambs brought in were autopsied and the stomach contents and visceral organs were cultured. The musculature of all of the lambs was edematous, and one lamb had necrotic ulcers on the liver suggestive of the lesions of infectious enterohepatitis in turkeys, as previously described by Baker and Stone.[2] Under aerobic incubation no significant organisms were isolated, but under microaerophilic conditions with carbon dioxide, with gentian violet liver infusion agar plates and 5 per cent sheep blood plates, a vibrio was secured from practically all of the material plated. A similar organism could be demonstrated microscopically in smears of the stomach contents. This organism answered the description of *V. fetus* as listed by Bergey.[5]

On May 5, all of the sheep in the flock, with the exception of the lambs, were bled, and the serum was used in an agglutination test against the isolated *V. fetus*. Thirty-seven of the 79 sheep showed a positive reaction in 1:25 dilution; of these, 13 had some irregularity in lambing that might be attributed to *V. fetus* infection. There were ten positive reactions in 1:100 dilution; six of these serum samples were from sheep that had aborted. As a check on possible cross agglutination, nine normal sheep from the Michigan State College flock were bled. The strongest agglutination reaction secured was a partial in 1:12.5 dilution.

No additions had been made to the flock for a number of years, and as this was the first time any such difficulty had attended

*From the Department of Bacteriology, Michigan State College.

[1]Carpenter, C. M.: Researches upon a Spirillum associated with abortion in ewes. Ann. Rpt. N. Y. State Vet. Coll., 1918-1919 (1920), pp. 129-157.

[2]Baker, D. W., and Stone, W. S.: A study of *Spirillum ovis* infection in a group of ewes maintained under observation for two successive lambing seasons. Cornell Vet., xxix (1939), pp. 32-34.

[3]Graham, R., and Thorp, F., Jr.: Vibrionic abortion in sheep. J.A.V.M.A., lxxvi (1930), n.s. 29 (4), pp 568-573.

[4]Welch, H., and Marsh, H.: Vibrionic abortion in sheep. J.A.V.M.A., lxv (1924), n.s. 18 (2), pp. 203-210.

[5]Bergey, D. H., Breed, R. S., Murray, E. G. D., and Hitchens, A. P.: Bergey's Manual of Determinative Bacteriology. (5th ed., The Williams and Wilkins Company, Baltimore, 1939.)

lambing, the eleven head of cattle on the place also were bled, for cattle also can be infected with *V. fetus*.[6, 7, 8, 9, 10, 11] However, no marked reactions were encountered in the agglutination test against *V. fetus* with dilutions of 1:25 or higher. It was later learned that an adjacent flock of sheep had been troubled by abortion, and this may have served as the source of infection.

[6]Smith, T.: Spirilla associated with disease of the fetal membrane in cattle (infectious abortion). J. Exp. Med., xxviii (1918), pp. 701-720.

[7]*Ibid.*: The etiological relation of Spirilla (*Vibrio fetus*) to bovine abortion. J. Exp. Med., xxx (1919), pp. 313-323.

[8]*Ibid.*: Further studies on the etiological significance of *Vibrio fetus*. J. Exp. Med., xxxvii (1923), pp. 341-356.

[9]Traum, J.: Bovine infectious abortion and associated diseases of cattle and new-born calves. II. The importance of *Bacterium abortum* of Bang and other microörganisms in bovine infectious abortion. California Agr. Exp. Sta. Bul. 353 (1923), pp. 294-325.

[10]Barger, E. H.: Abortion induced by *Vibrio fetus*. J.A.V.M.A., lxxii (1927), n.s. 25, pp. 468-474.

[11]Gilman, H. L.: Some causes of abortion in cattle free from Bang's disease. Cornell Vet., xxix (1939), pp. 153-165.

Pharmacology Revived

Notwithstanding the philosophy and brilliant discoveries of Paul Ehrlich which kept alive the theory that chemical agents would become the ultimate nemesis of microbic diseases, pharmacology remained but a sidelight in the march of medicine until sulfonamide therapy was found to possess unquestionable value in the treatment of streptococcic infections.

Though the worthiness of Ehrlich's organic arsenicals (arsphenamine and neoarsphenamine) was no longer debatable and certain dyes had been shown to be microbicidal in stated protozoan infections (bovine piroplasmosis, equine trypanosomiasis), these facts did not arouse general interest in chemotherapy until 1936, when Colebrook, Loenard and Kenny* wrote their article on the curative action of prontosil in puerperal infections of women. The response to that report in the four years following not only made sulfanilamide the greatest medical sensation of all times, but also revived world-wide interest in the study of pharmacology.

In veterinary medicine, the fourth decade of this century will be recalled also as the time calcium therapy was shown to bring spectacular cures in milk fever of cows. Here, a grave acute disease in which death is but a matter of hours in a majority of instances is quickly cured by injecting a chemical into the blood stream.

And not to be overlooked is the broad field of chemotherapy that was opened up by the prevention and cure of blacktongue with nicotinic acid and by the new indications for the other fractions of the vitamin B complex.

The latest addition to the list of specific chemical cures is phenothiazine as an anthelmintic which is reputed to possess unusual vermicide properties with but little toxic action on the host.

Given sulfanilamide, calcium gluconate, nicotinic acid, thiamin chloride, riboflavin and phenothiazine, in their respective rôles, it is not surprising that pharmacology is staging a comeback on the medical curriculum.

*The Lancet, ii, Dec. 5, 1936, p. 1319.

Alopaca in a Mare

Mare suffering from alopaca. Her colt (center) showed no evidence of this affection and was perfectly healthy, as was the horse shown at the right.

W. J. Butler, state veterinary surgeon of Montana, submitted the picture reproduced above. Although the colt can not be seen in full view, the report states that it showed no evidence of alopaca.

SURGERY & OBSTETRICS

Practical Cattle Surgery*

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West Liberty, Iowa

THE PRACTICE of veterinary medicine and surgery varies greatly in different sections due to the differences in climatic conditions and the nature of the forage. For this reason certain surgical treatment may be paramount in one man's practice and of little or no importance in the practice of another.

SURGICAL CORRECTION OF TORSION OF THE UTERUS IN THE COW

Torsion of the uterus or the rotation of this organ upon its longitudinal axis occurs most frequently in the cow. This is due to the fact that the gravid horns extend well forward, beyond the brim of the pelvis, into the abdominal cavity. Toward the end of pregnancy the anterior end gets farther and farther from its ligamentous attachments and there is little to prevent its revolving. Williams says, "A highly important contributing cause of torsion of the uterus in the cow is that the cornua curves downward, backward and then upward, instead of upward and forward as in the mare and most other animals."

We have encountered all our cases in the dairy breeds. This may be due to the more flaccid condition of the abdominal walls of the dairy cow. The beef breed's thicker and more rigid walls would have a tendency to hold the uterus and its contents more in place. Stanchions, slippery floors and gutters may play a part in the twisting.

Torsion may occur any time after the fifth month of pregnancy. The twist itself is in the cervix and vagina. Anything less than a one-fourth turn or a 90-degree segment of a complete circle is imperceptible. From this up to a complete turn, marked symptoms are present.

The symptoms are not diagnostic without a vaginal or rectal examination. Soon after the twist occurs the animal kicks its belly, lies down and rises, switches the tail and many times shows signs of labor. If the first symptoms go untreated and the fetus dies because of restricted circulation, the pains become less severe. Because of the longitudinal stretching of the os cervici, it usually dilates to a certain extent and the fetus becomes emphysematous. Inflammation spreads through the walls of the uterus and adhesions occur between the peritoneal surface of the uterus and the surrounding organs. If this occurs, the prognosis is bad.

When the vagina is explored, ridges or grooves are palpated on the roof and the floor. If the ridges on the roof extend toward the right and the ones on the floor to the left, the uterus has rotated toward the right in a direction away from the rumen. This is true in a majority of cases. If the uterus has made a one-half turn or less, it is possible to worm one's hand into it, but from a one-half turn on up to a little over a turn no entrance can be made. The vulva is contracted and somewhat sunken.

After a diagnosis of torsion has been made, secure the cow in a stanchion, if possible in a standing position, and clip and shave the right flank. Tie the hind legs together with a small rope, loosely enough to prevent tripping, but tightly enough to prevent the operator from being kicked.

Inject a local anesthetic consisting of one

*Presented before the Section on General Practice at the 77th annual meeting of the AVMA, Washington, D. C., August 26-30, 1940.

3-gr. procain tablet in 20 cc. of warm water, or use a prepared solution. Procain tablets are convenient to carry in a surgical kit. Make an incision through the skin, abdominal muscles and peritoneum; reach through the incision and back to the vagina. The twisted portion will feel like a large rope.

If you have not made sure of the direction the uterus has turned, you can determine this by palpating the elevations and depressions on the peritoneal surface of the vagina, or if you have made up your mind by previous vaginal exploration, this can be confirmed. If it has rotated toward the right, the uterus must be rolled toward the rumen. Its peritoneal surface is smooth and it invariably contains an immense amount of fluid. One's first impression is that an organ as unwieldy as this enlarged uterus full of fluid can not be rotated. A great deal of care must be exercised not to rupture it in the manipulation. Reach down between the rumen and the uterus and search for an extremity of the fetus through the walls of the uterus. If a hock, the elbow or hind leg can be felt, grasp it gently but firmly. Rock the fetus slowly back and forth. I have found that the uterus can be more easily moved in the direction of a greater twist. This should be done two or three times to get the fluid within the uterus to moving; then, with a sudden pull, start the uterus in the direction you wish it to go to untwist. When it has been turned to its correct position, fluid usually will gush from the vagina. Abdominal palpation of the vagina will reveal its correct position. All this should be done with the cow standing.

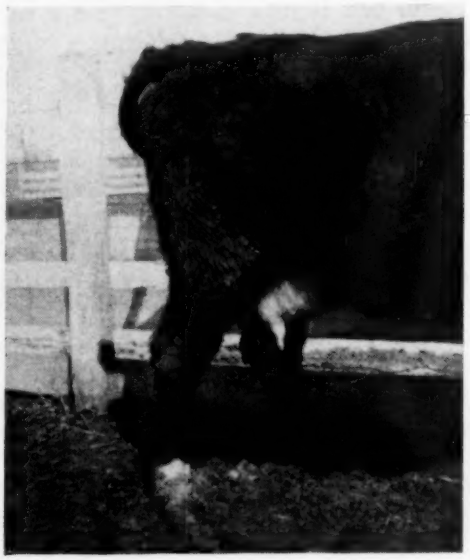
Suture the peritoneum and muscles and then the skin. Omit the last stitch, leaving a small opening for drainage. This makes a stronger job than suturing all the wall at once.

Care must be taken not to rupture the os in delivering the fetus. It is sometimes necessary to give it time to dilate.

This method has the following advantages over the rolling process for the correction of torsion. Rolling requires a large stall or preferably an open field and the aid of three or four men. The surgical method consumes less time, which is an asset to a busy practitioner. The surgical wound soon heals with apparently little discomfort to the patient.

STRICTURES, SPIDERS AND ATRESIA OF COW'S TEATS

Any condition which threatens to interfere with the functioning of a cow's teat is serious from the standpoint of the dairy farmer. Occlusion or partial closure of a teat may occur in any breed. It is prevalent in good stables and poor stables, in cows hand milked and in those machine milked. The cause is an inflammation of



Constriction of a cow's teat caused by a "spider."

the epithelial cells that line the teat canal. A cow may be normal when dried off and freshen with strictures of one or more teats.

A stricture may occur anywhere from the base of the teat to the end. It may vary from a thin membrane stretched across the canal to a heavy fibrous band completely encircling the canal and entirely closing it, or it may have a small opening which allows the milk to come through slowly. A small, tumor-like formation may be present in the canal, commonly called a spider.

Diagnosis.—The larger fibrous obstructions can be palpated. The quarter has the appearance of being distended with milk and is soft and fluctuating above the base of the teat. Sometimes there is a distinct constriction at the point of obstruction. In other cases the milk leaks slowly through and when stripped out it requires time to refill. The teat may also be large at the base and small at the end.

The instrument used is a Case teat bistoury. This instrument can be kept clean, and the knife can be sharpened and is controlled by a spring which closes it when pressure on the handle is released so that no injury will result no matter what the cow does.

If the cow is in a stanchion, use a rope halter and tie her head, placing a slight tension on the neck so that she can not step back into the gutter. A one-half inch rope is placed just above the hock, tying the tail in with it. Hitch the rope to a post, litter carrier, or any solid portion of the barn behind the cow, pulling the leg upward and backward. It is best to have someone hold the end of the rope so that it can be quickly released. If the cow resists this restraint, she should be caste and tied.

Complete asepsis is necessary in this operation; the quarter should be washed and dried and the end of the teat painted with tincture of iodine. The instrument should be sterilized by boiling before introducing it into the teat canal. I lubricate it with zinc-oxide ointment. This avoids injuring the delicate lining membrane of the sphincter.

If a membrane closes the canal, the bistoury is thrust through and it is cut or torn at least four ways, or until the milk comes through freely. In case of the fibrous band the bistoury is forced through and the band cut in several places until the milk comes freely. If a spider exists, it is usually supported by a membrane which can be punctured near the wall of the teat canal. In some of these cases I endeavor to use the knife edge a little and cut slightly, sometimes incising the spider and going across to the opposite wall. I then come back to the center and cut out to each wall, providing the spider is no larger than a buck shot. If it is as large as a pea, I try to tear the membrane that supports it and allow the milk to come through around it.

These growths have a nonvascular portion, and if the cutting is done in this area, the prognosis is more favorable. The success of the operation is directly proportional to the amount of hemorrhage. A few streams should be milked every two hours the first day and the teat should not be milked dry for three days. The milk tends to hold it open. If it has a tendency to close, instruct the owner to grasp the end of the teat and exert pressure to the operative area by forcing the milk down through with the other hand.

Closure of the end of the teat is termed atresia. This may be partial or complete. Heifers sometimes freshen with a teat full of milk, and no opening. The end of the teat is first pierced with a small, sharp bistoury and the Case bistoury used to enlarge the opening four ways until the milk leaks out. As healing takes place a natural opening will be formed, providing no infection enters the wound. To keep the ends of teats open that have a tendency to scab over, I use yellow oxide of mercury eye ointment that comes in tubes. It is nonirritating and can be inserted into the external duct with safety if the owner flames the small nozzle on the end of the tube with a match before inserting.

In hard milkers or partial atresia the bistoury is introduced, opened slightly and placed against the muscle in such a manner that the sphincter is incised while leaving the skin intact. Incise in four places deeply enough to allow the milk to be expressed freely. If the skin is incised, it will do no particular harm, but may leave a leaky teat and there is more of a tendency toward scab formation. A pledget of cotton is rolled into a small cone, dipped in iodine and inserted between the cut surfaces. This seems to be of value because it prevents the formation of a clot. I sometimes introduce a wax teat dilator

which keeps the teat open if it is milked dry immediately following the operation.

I follow the method, with a slight variation of Bleecker.[1] Dr. Bleecker stated that above 70 per cent of his teat operations were successful.

AMPUTATION OF THE UDDER

In cases of severe mastitis accompanied by a high elevation in temperature, complete anorexia and discoloration of the udder terminating in gangrene, it pays to amputate the udder before death intervenes. This operation should be attempted only after all treatment for mastitis has failed, especially in high-producing dairy cows.

The cow is cast and tied with hocks slightly flexed. She should be propped almost on her back. Chloroform anesthesia is used. Choral hydrate seems to be contraindicated. A skin incision is made around the uppermost half of the udder about 2 in. from the abdominal wall. Dissect the skin down to the abdominal wall. Cut the udder away from the abdominal floor laterally. Search for the mammary artery. This artery, accompanied by a large nerve and vein, lies about 2 or 3 in. in from the outside of the average udder, and is about midway between the anterior and posterior borders. It may be as large as a lead pencil. The pulse can be felt as it is approached in the dissection. Isolate it and ligate with linen in two places. Sever the artery and separate the gland from the abdomen as far as the median ligament. Little attention need be paid to the hemorrhage after the mammary artery is ligated. The mammary veins anterior can be ligated to keep the blood from running back into the field of operation. The cow is rolled over and the same procedure carried out on the other side, after which the median ligament is severed. The flaps of skin are brought together and sutured. Fly spray should be applied twice daily in warm weather. Dusting powder can be used on the wound. I have used hydrated lime after four or five days.

This operation is contraindicated in cold weather. The cold air rushing into so large a wound is apt to cause a fatal shock.

Left: Cow with gangrenous mastitis. The temperature was 106° F. with complete anorexia. The udder was amputated. Center: The udder has just been amputated. This shows the restraint for the operation. Right: The cow minus her udder as she walked to the barn.

ISCHIAL URETHROTOMY FOR THE RELIEF OF URINARY CALCULI IN STEERS

The exact etiology of urinary calculi in steers is problematical. Some claim that an inadequate water supply tends to develop them.

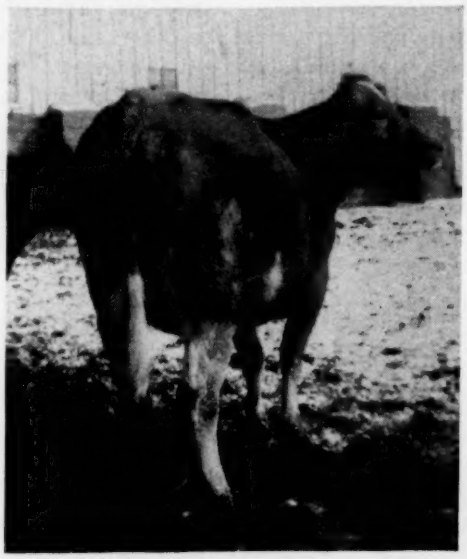
Johnson, Palmer and Nelson[2] of the Minnesota Agricultural Experiment Station, conducted an interesting experiment in sheep which demonstrated that dietary magnesium imbalance failed to produce urinary calculi in wethers.

[1]Bleecker, D. E.: Treatment of stricture and atresia of cows' teats. Cornell Vet., xiv (Jan. 1924), pp. 41-44.

[2]Johnson, D. W., Palmer, L. S., and Nelson, J. W.: Failure of dietary magnesium imbalance to produce urinary calculi in wethers. Vet. Med., xxxv (June 1940), pp. 353-357.

In southeastern Iowa urinary calculi are common in steers ranging in age from 2 months to 2 years. The water in this section comes from deep wells and is rather hard. This may be a contributing factor. It affects the shipped-in feeder steers as well as the natives.

Symptoms.—The calculus forms in the bladder, passes into the urethra and lodges either at the first or second curve of the sigmoid flexures of the penis. This occludes the urethra, and the bladder fills with urine. The animal strains constantly, stretches out on all four feet as if trying to urinate and sometimes shows colicky pains. If the calculus passes the second curve of the flexures and lodges a few inches from the end of the penis, the urethra will sometimes rupture and allow the urine to leak out into tissues surrounding the prepuce, causing an extensive swelling.



Cow that has completely recovered from an udder amputation.

If the occlusion of the urethra is complete and no treatment is given, the bladder finally ruptures, the abdominal cavity fills with urine, and the steer dies, either from uremia, pressure of the liquid or peritonitis.

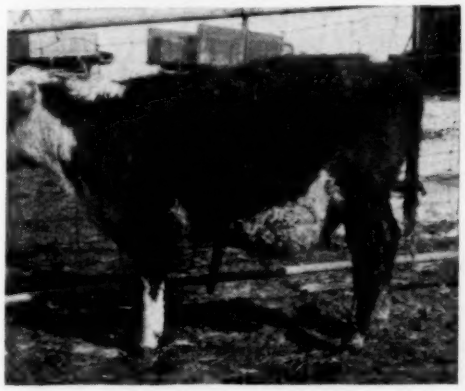
A rectal examination will confirm the diagnosis. The distended bladder can be easily palpated. If slight pressure is applied with the fingers to the region just below the anus over the ischial portion of the penis, a rhythmic motion of the urethra can be felt which is caused by the futile effort of the steer to urinate. Another symptom, almost diagnostic, is the contraction and relaxation of the sphincture ani.

Operation.—Epidural anesthesia is used. An incision is made in the median line about 4 in. below the anus, through the skin fascia, between the muscles down to the penis. The retractor penis muscle can be pushed to one side and need not be split or severed. The penis is separated from the surrounding tissues by blunt dissection. Place traction upon the penis with one hand and, using a blunt bistoury, sever the penis at the lower part of the incision and pull the stump which contains the urethra continuous with the bladder out behind. A small pair of forceps, a probe or small catheter should next be placed in the urethra. A stitch is placed through the corpus cavernosum and it is sutured to the skin on one side. A similar stitch is placed on the other side. This anchors the end of the severed penis firmly to the outside and affords a direct and unobstructed opening for the bladder through which the urine can be voided. The distal portion of the

Steer with symptoms of a distended bladder.

penis is left in place. A slight swelling of this portion of the severed penis may take place, but soon subsides due to the rapid establishment of sufficient compensatory collateral circulation.

The urethra is next split on the dorsal side with the scissors for a distance of about 1 in. It is spread out fan-shaped and sutured to the margins of the wound on each side. This prevents a stricture when the wound heals and forms a permanent urinary meatus, allowing the owner to keep the animal as long as he wishes.



This steer has a ruptured bladder due to a urinary calculus. It is too late to operate.

This operation has been performed quite frequently in my practice during the past six years, with 100 per cent success.

WHITE HEIFER DISEASE

White heifer disease was described by the late Dr. Bemis. It occurs in white and roan heifers of the Shorthorn breed. It is a congenital malformation of the vagina which may be either a short, thin-walled organ or a persistent hymen or membrane stretched across the lumen just anterior to the urethral orifice. I have encountered both forms of this condition a few times. If the vagina is short and thin-walled, the penis of the bull punctures it at the first service, the heifer strains, passes blood, and sometimes dies from peritonitis.

In the case of the persistent hymen the service of the bull results in a small perforation of this membrane and the heifer usually conceives. This terminates in a dystocia which can be remedied only by incising the membrane beginning at the center and extending to the vaginal walls. The delivery of the fetus results in considerable hemorrhage. If there is a constriction at the point of attachment of membrane, it may be necessary to incise the wall of the vagina. This should be done on the dorsal part of the vagina.

June 21, 1940, I saw a white heifer which had been off feed for two days. She strained constantly. Vaginal exploration proved the urinary meatus to be normal, but about 2 in. beyond it the vagina seemed to end. Rectal examination revealed what I supposed was a distended bladder. I first passed a rubber horse catheter into the bladder. A small amount of urine came, but it soon ceased to flow. I tried a metal catheter with the same results. I then punctured through the rectal wall, what I supposed was the bladder, with a horse trocar. A white, foul-smelling pus came through the cannula and about six quarts were drained from what was then recognized as a large abscess. The heifer seemed much improved and began to eat. The owner had purchased this heifer and thought that she might be pregnant, although there was no definite history.

Ischial urethrotomy was performed upon this steer when he weighed less than 300 lb. Photo shows the artificial urinary meatus ten months after the operation.

EDITORIAL

The Reorientation of Veterinary Medicine

THE IDEA of orienting the veterinary service in the public health service is not new; nor is it of American origin. Shifting this service from agriculture has been entertained on both sides of the Atlantic. In Italy, the transfer was made when the veterinary faculties were brought into the jurisdiction of the universities. Elsewhere, the proposal to make the change was disapproved. Agriculture won the debate.

The topic is not a flair of the moment. Already in 1897, when New York was creating the office of state veterinarian, the intent was to place the new office in the state board of health, but the *coup d'essai* was thwarted. Writing editorially on affiliating with medicine instead of agriculture, a popular journal[1] said:

> The advantage would be outweighed by the danger of widening the gap between the consumer and the producer of animal-food products.

Elsewhere,[2] the appointment of a veterinarian to the state board of health of Minnesota was pronounced "a step in the right direction." Although these two opinions refer to different relations, they show that the question of veterinarians in public health work was alive 43 years ago. In fact, the association began with the studies of Pasteur on the infections interchangeable from animals to man. The thought of medical in lieu of agrarian communion for veterinary medicine was born with the discovery of animal-to-man transmission of specific infections. Meager as the prospect of the change being made may be, it is nevertheless, a question that keeps bobbing up in all countries from time to time. The thought lives on because there is merit on both sides. Although here we are of agriculture with the prospect of forever remaining so, the question of reorientation never dies.

ARGUMENTS PRO AND CON

There are fundamentally sound arguments on both sides. The main one held out in favor of remaining attached to the agrarian set-up is that conserving property for farmers is the principal function of veterinary science. Public health is but incidental thereto. The control of animal diseases which happen to be transmissible to man is not primarily the responsibility of the public health service, nor is amplifying the nation's food supply a duty of the physician; these are obligations of farming.

Moreover, transforming our entire educational system from the agricultural to the medical domain would be an undertaking that is entirely out of proportion to the benefits in sight. Our direction has become too deeply rooted through the years to justify such a revolutionary mutation. An endless array of federal and state laws would have to be discarded and new ones enacted, and the numberless functionaries now administering them would have to be shifted from their present command. Admittedly, the economics of all this is unpredictable. Thus the arguments on the one side multiply as the picture of the veterinary service files across the screen.

On the other side there lie equally good reasons why the veterinary-agricultural espousal should be divorced. At the head is the sound reasoning that the agriculturally connected inspector of food is in the absurd position of rendering a highly specialized service of acknowledged necessity for the buyer, although trained, employed, directed and paid by the seller.

[1] J. Comp. Med. & Vet. Arch., xviii (March 1897), p. 150.
[2] *Ibid.:* p. 153.

Measured from the forensic tangent of this technical work, it has been said that there is no comparable paradox. The antilogy seems self-evident, but beyond this superficial analysis lies the fact that the age-old custom of assigning animal-food inspection to the veterinarian has no logical substitute. The family physician would be out of place in the hog lot and shambles, and incompetent unless specially trained. The day is not near when practical meat inspection becomes a part of the medical clinic, and the science a part of the regular curriculum. Nor is there anything in sight to replace the five-year veterinary college course for the training of food inspectors. Were the veterinary service taken bag and baggage from the agricultural circle, agriculture would for a long time continue to command the production of the personnel.

Moreover, the personnel of a meat-inspection force in a large country like the United States constitutes a reserve for emergency field work for which the best trained meat-inspection specialist might not be qualified, nor would it be subject to call from another department.

THE PRACTITIONER'S SIDE

Difficult and unwise as the proposed reorientation would be, the fact remains that movements in that direction never ceased to be entertained. Here we strike an underlying cause. In several notable respects agriculture misapplies veterinary science. Even as in 1897, New York veterinarians in the field of practice thought that the state board of health would be the better master, and the unwisely approved practices that educated veterinarians have had to endure through the years have created the desire to be removed from agricultural control. While the desire has seldom developed beyond the level of local quarrels, classified as mere efforts to increase the profits of practice, it has a deeper root and meaning. In the councils of the profession discontented practitioners are regarded as a problem of national proportions: the development of a sufficient veterinary service all the way from the making of an ample number of expertly trained fighters of animal disease to the wise and proper use of them.

It is a matter of fact, worthy of careful attention, that discouraged private practitioners and underpaid publicly employed veterinarians forecast an onus for the farmer as well as for the veterinarian he badly needs. Nothing could be more unwise than laying obstacles in the path of a service delegated to amplify the nation's food supply in these days of the fifth column. There is no defendable reason that a professional group as necessary to public welfare, and farming in particular, should be so misdirected that its members educated by and for agriculture should be driven from the population of the rural districts, for whom they are trained, and seek a living in cities out of the command of their former master in order that they may practice their profession unhampered by nonprofessional competition. The situation is no less grave because it is a hackneyed one in the clinical branch of the service.

Unnoticed, the modality is having its repercussions. More than 20 per cent of the total veterinarians in the United States are in the federal service, and state services are adding to their forces as fast as rural veterinarians flee to the cities. Or, putting it from another view, a large percentage of veterinary students enter college for an urban destination in the first place, because country practice has been given a black eye.

Increase in the public service is as inevitable as the noonday sun. The nation can not afford contagious diseases of its live stock, and the people want food. These public services must, therefore, increase their forces to compensate for the hegira of private practitioners to the cities. Not generally considered in a survey of this situation is the practitioner's increasing devotion to small animal practice in the smaller centers of population. Anyone who will trouble to study the psychological factors of present-day mixed practice common to small cities will agree that practitioners lose interest in farm animals just as fast as their income from small animals

augments. This trend is probably more detrimental to farming than the trekking of rural practitioners to the cities.

To be remembered is the fact that the public service has nothing to do with the surgery and medicine that salvages the farmer's individual animals. The cases of dystocia, hernia, hanging afterbirths, colics, azoturia, milk fever, acetonemia, poll evil, fistula of the withers, quittors, ringbone, shipping fever, fractures and wounds, heatstroke, etc., to name but a few of the many animal tragedies that escape the pencil of the statistician, take a tremendous toll from the pockets of farmers in the absence of a convenient practitioner. The loss of animals from these sporadic catastrophes often accounts for the difference between the profit or loss of a year.

Another repercussion of absent veterinary service are the present epizoötics in France which German and French veterinarians are striving in vain to subdue. Contagions in animals allowed to run amok for a short time are not easily brought under control. Animal diseases have always been a perturbing threat to nations at war. They spell defeat for armies and account for the hunger, famine and pestilence that come upon the people; but, first of all, they denote poverty for the farmer. It seems reasonable to ask what sort of fate awaits our farmers when their discouraged veterinarians have flown to the civil or military service or moved their families to the cities.

The veterinarians of this and other countries are beginning to think in concert. The profession, for the first time in history, is being organized into a more solid unit. The smallness of numbers is made up by the character of their work. In dealing with problems of national significance, the veterinary profession of the United States has always been altruistic and fearless. A weaker group might have cringed before the opponents of its many colossal undertakings within the agricultural circle. Yet, the profession is not dissatisfied with its agricultural parentage, except to the extent that utilizing veterinary science to the people's advantage is prevented for selfish reasons. Reorientation is not on the profession's program. But, assuredly, efforts to make the present connection work to the benefit of all concerned is and shall always remain on its trestle-board.

The allegory is simply this: We are a family of adult children striving to reform inherited habits of our parents with honor, respect and appreciation but without forsaking our social and scientific status in a critical world.

Personal Names for Diseases: Bang's Disease

IN LIEU of a more definitive term, it was once the custom to name a disease for the physician who first described its syndrome. Thus, through the years medical terminology became cluttered with a list of meaningless names. Addison's disease, Hodgkin's disease, Meniere's disease and scores of others may be cited as examples found in the list of confusing names. Although fewer in veterinary medicine, we have our Aujeszky's disease, Johne's disease, and Bang's disease. The latter is of recent origin but is gaining in usage, and Carré's disease in the offing of our literature. Whether or not we should go on making up a long list of these personal, "possessive case" terms comparable with the confusing array found in the medical dictionary is a question to ponder in the advance of veterinary medicine.

The JOURNAL, to which readers of veterinary literature are apt to look for guidance, believes that no new names of that class should be added and that the few we now use should be abolished. Certainly, pseudorabies, paratuberculous enteritis, and bovine brucellosis are more revealing to the casual reader.

So, if "Bang's disease" is replaced by "brucellosis" in the JOURNAL, readers will understand that the change was not accidental. To single out the bovine form of the disease for a special name is no longer relevant.

Dead Chickens Sold for Food

THE APPETITE for savory capon was hard hit when *PM*, New York's famous "no advertising" newspaper, charged that sick and dead chickens are sold for the dinner table by dealers in cheap chickens. As the story goes, workers in the freight yards where poultry arrives gather sick and dead chickens in large numbers, smuggle them out of the yards in sacks, and sell them to merchants regularly engaged in the sale of their loathsome take. According to the regulations dead fowl must not be taken from the yards, except in metal containers after being thoroughly denatured with a disinfectant; but somehow there is a leak. As .25 to 1 per cent of the chickens arriving at the freight yards are either sick or dead and most of them fall into the hands of the ghouls, the traffic in that class of poultry belongs to the big business class, the report boldly declares.

Moreover, because of inadequate inspection, large numbers of uninspected chickens reach the slaughter houses every day to be eventually passed on to the same class of dealers.

This investigation has attracted considerable attention far beyond the bournes of Manhattan and the Bronx where interest is taken in the adequate inspection of food as a factor in maintaining public health.

The JOURNAL does not join *PM* in pinning the blame on the health department, but upon a care-free public which through lack of interest does not provide that department with adequate laws and sufficient funds to carry out the kind of inspection the unsuspecting consumer needs. The fact that the conditions exposed in this burst of indignation can and do exist is a reflection not as much upon health departments as upon public indifference to a fundamental health project—food inspection thoroughly and intelligently done.

An investigation of the charges made against New York's health commissioner reveals the astonishing information that but three men at $40 a week are employed to inspect an average of 150,000 live birds per week and that these inspectors are appointed not by the city but by the Live Poultry Commission Merchants Association. Granted that the inspectors are competent and speedy enough to somehow inspect that number of birds and supervise the disposal of the "rejects," the fact remains that they are subordinates not of the public but of dealers in chickens, some of whom are prone to find an outlet for sick and dead birds among the poorer classes.

New York City is not pointed out here as a unique example of faulty food inspection but as a city that scores better than the average in that respect. Its three inspectors of live poultry are just three more than many important cities employ for that purpose.

If *PM* desires to get at the bottom of things in behalf of the millions not protected by the federal meat-inspection system, it would find plenty of proof that the cause of loathsome food on the markets is public indifference to food inspection, not unfaithful health officers or Machiavellian merchants. In public service, the people may get what they want, but they never get more.

In view of their millions of readers, metropolitan newspapers with their penchant for chastising public officials for neglecting duty could mete out an excellent service by cultivating a better understanding of food inspection and its bearing upon the health of a modern population.

Community Sales Cause Dissension

A MEMBER writes: "Three veterinarians at this place have been testing cattle for interstate shipments for many years. Many cattle leave here every week from two commission barns, and a portion of our income is derived from testing them. The neighboring state also has sales barns of this kind, but lately the ones here have been getting most of the business. In order to retaliate and to inconvenience these barns the state veterinarian of the adjacent

state employs a man to patrol the highways and intercept outgoing trucks. Truckmen with health certificates in good order are stopped, delayed and harassed. Sometimes the health certificates are confiscated by this man on the highway and thus leave the truckman without any evidence that his cargo has been tested. The state veterinarian of the adjacent state notified our state veterinarian that cattle from here must be tested 'under the supervision of the state veterinarian of our state.' The result has been that our state veterinarian has placed a man here to do the testing at state expense and thus has taken the work away from us practitioners, all of whom are accredited and have a spotless record. What I would like to know is the ethics of this situation. I would like to know what our association [AVMA] thinks of a state veterinarian who will thus take work away from practicing veterinarians."

Inasmuch as it is a policy of the AVMA to encourage the use of local practitioners for public work, the above letter is published to show that the trend in some instances runs in the opposite direction and that redoubling the effort to bring about the desired reform is a current necessity in the Association's labors. Members, however, should remember that pending the enactment of definite laws governing the matter stated, the Association's efforts are limited to moral persuasion. Most all of the state veterinarians cultivate friendly relations with the practitioners and use them to improve the service they command. An opposite course is costly to the state, injurious to the livestock industry, and a wanton disrespect for the practitioner.

State Examining Boards

THE MEMBERS of state boards who examine applicants to practice veterinary medicine fill a place of importance in the affairs of a country. They have a noteworthy duty to perform. The future of the veterinary profession lies in their hands. Their work of today will reflect through years to come. By preventing the unfit from entering the veterinary service they play a cardinal rôle in the preservation of a sufficient animal industry and in the supervision of the food derived therefrom.

It has been argued that such boards are not necessary on the ground that a diploma granted by a recognized school of veterinary medicine should be ample evidence of qualification to practice. *Per contra,* as was frequently pointed out in human medicine, that doctrine is unsound for the reason that the state board examinations keep the student aware that professional ability is not all acquired in the senior year. Cramming to pass final examinations does not finish a medical education if the fundamentals of the preceding years are forgotten. State boards glorify the freshman studies and provide a blockade to the absent-minded graduate.

The General Practitioner's Balance Sheet

IN A REFERENDUM to adjudicate what a veterinary practitioner should earn, there are tangibles and intangibles to enter on the balance sheet.

The cost of keeping in readiness 24 hours a day through the year is an item of expense to be entered. Then, there is the expense of keeping abreast with the times through books, magazines and society work patronized for the public's benefit. To be deducted from the gross earnings depreciation of costly equipment must likewise be considered: instruments, expended drugs, apparatus, automobile, raiment, and furniture and fixtures. Uncollected accounts and the charity work donated to the poor also must be underwritten to make the balance tell the whole truth.

Among the intangibles stands the *sans souci* of being one's own boss—the seventh heaven of professional life—and the satisfaction of shaping the important matter of personal affluence by the pleasant toil of refining the technical ability that wins public appreciation.

WITH THE EDITORS

The Rabies Situation

IN GENERAL, dog fancy is opposed to rabies vaccination. The principal loser is dog fancy itself which, in opposing vaccination, tends to make the owning of dogs less popular. The coast to coast publicity given to rabies through the objection raised against vaccination has made the public rabies-conscious without the sense of security protective vaccination for any disease impresses upon the mind. Granted that rabies vaccination does augment resistance to a certain degree, dogdom would profit by arguing that rabies is less of a menace in vaccinated dogs. That would do more toward removing the fear of owning a dog than quarreling over the merits of a harmless vaccine. Moreover, vaccination itself is always evidence that other preventive measures also are being taken to prevent the spread of the disease.

The charge that the makers of rabies vaccine are the power behind vaccination is not supportable. Among the 90 or more biological products made for domestic animals, rabies vaccine is the least popular in the production laboratories. Its making is neither popular nor profitable. Ask the man who produces it.

Information Re Rabies Vaccination

"A French veterinarian named Remlinger is often quoted in discussions on the virtues of rabies vaccination. Can you give me the facts or the reference?"—*J. L. D., Michigan.*

The querist evidently refers to the work of Remlinger and Bailly of Morocco. These investigators of the Pasteur Institute vaccinated 264 dogs and had them carefully observed by 16 veterinarians engaged in veterinary work at different places. The report states that 30 of these dogs had been bitten and two of them were bitten after having been vaccinated. The dogs were kept under observation for from 3 months to 23 months. No case of rabies developed. The report appeared in *Revue générale de Médecine vétérinaire* (April 1929), a French journal no longer published. This report is often referred to in defending the merits of rabies vaccination because it comes from talented scientists bent upon seeking the truth. Moreover, the high incidence of rabies in Morocco gave the observation the earmark of a controlled experiment.

Veterinary Science in Argentina

With the July-August (1940) issue *Revista de Medicina Veterinaria,* Buenos Aires, one of our valuable exchanges, celebrated its 25th anniversary with a special souvenir number dedicated to Dr. Cosme Massini Ezcurra, minister of agriculture, his immediate subordinates and prominent figures of the agricultural circle. The year also marks the 57th anniversary of the founding of veterinary education in Argentina. This event, too, was celebrated with appropriate ceremonies including a large banquet at the Club Universitario of the capital city.

The national veterinary-medical society of Argentina was founded in 1897, its principal veterinary journal in 1915, and its veterinary educational system in 1883.

The publication of the *Journal of Comparative Pathology and Therapeutics,* longtime classic of English veterinary literature, has been suspended for the duration of the war. The *Journal of Pathology and Bacteriology* (human) is pointed out as a suitable medium for the veterinary research articles formerly published in the temporarily suspended journal. *(Vide, The Veterinary Record, Aug. 10, 1940.)*

Veterinary journals from Europe arrive irregularly, and some not at all.

CURRENT LITERATURE

ABSTRACTS

Serum Treatment of Encephalomyelitis

Zichis and Shaughnessy, Chicago investigators, have demonstrated the curative value of rabbit antiserum in the treatment of equine encephalomyelitis (western strain) in guinea pigs. The experimental animals were rabbits, guinea pigs and Swiss mice. The virus used for "hypering" the rabbits was Kelser's, obtained from The Rockefeller Institute for Medical Research and propagated on chick embryos. Microscopic studies of the brains of infected, immunized (treated) and control animals were made. Photomicrographs differentiating the lesioned brain structure of given subjects (guinea pigs) are reproduced.

Various conclusions can be drawn from this admittedly limited experimental work:

1) The value of antiserum treatment of virus diseases was proved. Although when cells are invaded with a virus they are sheltered from the action of an antiserum, all of the susceptible cells are not invaded at once and thus leave uninvaded cells open to the protective action of antiserum. This property is seen in the benefits derived from antiserum in other virus infections.

2) The commercial horse antisera used in the treatment of equine encephalomyelitis lacked potency in the doses given. Potency tests made upon animals in standardizing antiserum are more dependable than *in vitro* neutralization. A serum produced by the immunization of horses has a potency of but 0.1 per cent as high as the hyperimmune serum used. After visible signs of the infection appeared, commercial horse serum gave no beneficial effect in the animals treated.

3) Although other virus diseases yield to antiserum treatment after symptoms of infection (fever) have appeared, these experiments furnish the first evidence of successful antiserum treatment of a virus disease that damages the structure of the central nervous system. [*Joseph Zichis, Ph.D., and Howard J. Shaughnessy, Ph.D. Experimental Western Equine Encephalomyelitis; Successful Treatment with Hyperimmune Rabbit Serum. The Journal of the American Medical Association, cxvi (Sept. 28, 1940), pp. 1071-1078.*]

"Test and Slaughter" in Bovine Brucellosis

Research on bovine brucellosis began at the Storrs (Conn.) station in 1913 and was followed without remission up to the present time. Confined originally to the University of Connecticut herd, the work during the past 15 years was extended to 624 herds and in 1931 the station laboratory became the state laboratory for Bang's disease. In this work the agglutination test was found "to be a strong weapon against this disease." Although abortions do occur from other causes, this fact makes the agglutination test all the more important. The accuracy of the test in experienced hands is incontestable. Although from the practical point of view there is reason to question the value of the negative reactions, the belief that cows approaching parturition become temporarily negative is without foundation. Repeated tests were found to be consistent.

The suspicious reactor is explained in the very nature of serological tests. The stage of transition from positive to negative in recent exposures, the light infections destroyed by the body defenses, and the rare animal that goes from positive to negative passes through an intermediate, or suspicious, stage.

The number of tests required to eradi-

cate the disease varied from one to more than four. Eradication was less quickly accomplished during "abortion storms" than after the "storm" was over. In 64.5 per cent of the herds, one to two tests were required; in 22.7 per cent, three to four tests; and in 12.7 per cent, more than four tests.

The ways and prevention of spread, how disease-free herds are maintained, and abortions other than from brucellosis lead to a summary that leaves no doubt as to the authors' faith in the "test and slaughter" plan of handling bovine brucellosis. [*W. N. Plastridge, Leo F. Rettger and G. C. White. Some Observations on the Eradication and Control of Bang's Disease. Journal of Dairy Science, xxiii (Aug. 1940), pp. 755-763.*]

Sperm Stimulation in Bulls

Startling results were obtained by the use of ascorbic acid in the treatment of impotent bulls. The high concentration of ascorbic acid in the pituitary gland of cattle was the incentive for the study of its relation to impotence. As pointed out by Lardy and Phillips, bulls of low fertility have a low percentage of ascorbic acid in their semen. The opposite was found to be true of good breeders.

Tests were made on bulls of low rating, of slowness to breed, and of general sexual indifference. The data obtained were based upon the percentages of ascorbic acid in plasma and serum, the longevity of sperms in storage, microscopic studies, and the end results on restoring virility. Standard methods of analyses were employed. Tabulated data show the gratifying results obtained. Thin, watery, lifeless semen was transformed to thick, creamy, normal semen showing evidence of life and vitality. Two bulls, improved by the use of ascorbic acid, relapsed to their former state of impotence when the treatment was discontinued, but responded again to the therapy. Heavy service was believed to deplete bulls of the ascorbic acid obtained from exogenous sources. Comparable results were seen in four out of every five bulls treated.

Although not expected to cure all cases, injections of ascorbic acid were found to give favorable responses in certain types of sterility. One of the failures was attributed to atrophy of the testes.

In conclusion, the authors assert that subcutaneous injections of ascorbic acid restore the fertilizing power of certain impotent bulls, that potent bull semen normally contains from 3 to 8 mg. per 100 cc. of ascorbic acid, and that values below 2 mg. per 100 cc. are associated with impotence. In short, ascorbic acid is intimately involved in the physiology of reproduction in the bovine male. [*Paul H. Phillips, H. A. Lardy, E. E. Heizer and I. W. Rupel. Sperm Stimulation in the Bull Through the Subcutaneous Administration of Ascorbic Acid. Journal of Dairy Science, xxiii (Sept. 1940), pp. 873-878.*]

Ozonotherapy in Canine Medicine

E. Mery presented to the *Academie de Médecine Vétérinaire* eight years of experience with the use of ozone in canine medicine. The apparatus described consists essentially of a generator of magnetic effluvia through which is passed a current of pure oxygen. To prevent nitrous vapors, the presence of nitrogen must be avoided. Variations in the flow of gas and voltage easily permit the modification of the titre of the ozonated oxygen. The concentration generally used is 3.5 to 23 cc. per liter.

Locally, ozone has a sedative, antiseptic and hemostatic action and it accelerates cicatrization. The nasal, buccal, vaginal and uterine mucosae are sensitive to its action. As the gas is suffocating, inhalation must be avoided. Subcutaneous injections are painless and permit rapid absorption of the gas, but for systemic action the author prefers rectal injections, 80 to 800 cc., according to the size of the dog. As ozone attacks rubber, it must be used with metallic sounds. [*E. Mery. Ozonothérapie en Médecine Canine. Bulletin de l'Academie Vétérinaire de France, xii (Dec. 1939), p. 399.*]

Lentin—Its Use in Equine Medicine

Lentin is known structurally as NH_2 CO, O C H_2 N $(CH_3)_3$ C L, or carbaminoxylchlorine chloride. This drug has great stability, is persistent in its action, and is exceptionally effective in the gastrointestinal tract, particularly in horses. Lentin has the following additional advantages which recommend its use in veterinary medicine: It is thermostable, is effective orally, is relatively cheap and can be given by subcutaneous injection.

Lentin was first used extensively in veterinary medicine in 1932 and was tried in several animal diseases with consistently good results. At the present time, it is used predominantly in this country in colics and impactions in the horse. Much work has been done with this drug by veterinarians in foreign countries and a voluminous amount of literature on the subject has been carried by foreign veterinary journals —most of which is very favorable to the use of lentin.

Burgett and Bardens, in their article, state that the drug is used by the majority of German veterinarians and has been adopted by the German army as a standard item to replace arecoline, eserine, and barium chloride—the rapidly acting cathartics formerly used. They quote various writers on the use of the drug, all of whom appear favorable to its use. For instance, K. Neuman-Kleinpaul and Ruscher report, "Lentin is an active remedy in cases of obstruction of the caecum and colon in horses and it quickly cures tympanites."

Jacob says: "Lentin undoubtedly possesses a stimulating effect on the motility of the stomach and intestines and on general gland secretion as a consequence of stimulation of the parasympathetic nervous system. Its indications are those of arecoline, though the effect is more pronounced and it can be used safely by subcutaneous injection in patients with weakened hearts where arecoline is contra-indicated."

Many veterinarians who have used lentin agree that the drug possesses great virtue, particularly in the treatment of equine digestive disturbances including impactions of the large intestine. It stimulates peristalsis and increases intestinal secretions to such an extent that impacted masses are often softened and become mushy and loosely formed. These factors are responsible for the favorable results obtained with lentin and account for its great popularity among veterinarians who have used it. Lentin does not depress the heart as does arecoline, eserine and barium chloride and, therefore, can be used in animals with weakened hearts. This is an important consideration as most animals suffering from the above conditions, when presented for treatment and before complete recovery, have a tremendous burden placed upon the circulatory apparatus.

G. W. Bardens treated 21 cases of so-called colics and impactions in horses, including one case of azoturia and one "choke," with good results. In two cases of severe dry impactions with inflammation of the bowel, lentin was ineffective, did not produce purgation, and the animals died. Bardens' case histories are indicative of the action and value of lentin in these various conditions in the horse.

As can be seen from representative case histories, lentin is effective in treating equine colics and impactions. It also aided in cases of azoturia and "choke." Stimulation of glandular secretions by lentin was marked, as evidenced by sweating, salivation and watery stools. Purgation was induced very frequently in 20 to 30 minutes, which shows that lentin has a very rapid action in stimulating peristalsis. In severe dry impactions, purgation is delayed—in such cases, large quantities of water or oil should be given with lentin to aid in softening the fecal mass.

In concluding these remarks on lentin and its use in veterinary medicine, the following observations are presented:

Dosage is 4 cc., repeated in 4 hours if indicated.

Lentin is contraindicated in heaves or any other asthmatic condition as its parasympathetic stimulation constricts the bronchioles.

An injection of atropine will stop the action of lentin should this necessity ever arise—in other words, the action of lentin can be controlled.

Lentin is considered by many veterinarians to be more effective than arecoline and safer to use. Lentin softens the impacted mass better than arecoline due to higher intestinal secretions. Another salient point in lentin's favor is that it is more regular and surer in action than arecoline.

In using lentin, especially in dry impactions, relatively large quantities of water and mineral oil are often indicated to aid in softening the impacted mass and thus facilitating the action of the drug. [*Capt. W. F. Collins, V. C., U. S. A. Veterinary Corps Bulletin, April 1940.*]

Vitamin Deficiencies

Besides deficient intake of vitamins there are adverse somatic conditions which cause vitamin deficiencies. Many factors can prevent the body from receiving an optimal amount of the vitamins it requires. These concern not only the intake but also the power of assimilation and utilization.

Diarrhea and other alimentary disorders play an important part in such deficiencies. The chronic diarrhea of pellagra, beriberi and of riboflavin deficiency is pointed out as one of these factors, along with other digestive disorders. The secondary deficiencies following in the trail of organic diseases are well known. Combinations of adverse conditions rather than single ones predominate. The fact that dyes experimentally administered pass through the alimentary canal within a few hours indicates the rôle diarrhea may play in preventing vitamins from being appropriated.

Organic changes in the intestine may interrupt absorption. Even simple sugars may not be absorbed in states of deficiency. Bacterial synthesis of vitamins, such as the forming of nicotinic acid in the colon, may be impeded. Other vitamins when not manufactured from basic alimentary material (carbon, oxygen, nitrogen, hydrogen) in the process of digestion may account for syndromes of avitaminoses. It is logical to suppose also that chronic diarrhea decreases the phosphorylation of vitamins. Pain, fever, nausea, vomiting, anorexia may be the blockades.

In the case of vitamin B, which is recognized as an important supporter of the digestive tract, the alimentary dysfunction is corrected by parenteral injections of crystalline vitamins, but these do not take the place of high-protein and high-calorie diets. Thiamin hydrochloride, nicotinic acid amide and riboflavin answer the specific purpose. [*W. H. Bean, M.D., and T. D. Spies, M.D. Vitamin Deficiencies in Diarrheal States. The Journal of the American Medical Association, cxv (Sept. 28, 1940), pp. 1078-1081.*]

BOOK NOTICES

Veterinary Obstetrics

The art of managing pregnancy, labor and post-parturient adjustments of mother and offspring has been more or less conglomerated in veterinary literature with the whole group, or some, of the disorders related to the process of reproduction. That is, the scope of gynecology (were that word adaptable to animals) was encroached upon without uniform modality by the authors of veterinary obstetrics. Complete coverage of "animal gynecology" was undertaken for the first time when, in 1921, W. L. Williams published *The Diseases of the Genital Organs of Domestic Animals* and thus divorced two important fields in the domain of domestic animal medicine. The divorce itself is veterinary history. It started a new era for the literature on reproduction in animals.

The third edition of *Veterinary Obstetrics* is mainly obstetrical, *per se*, and is so largely a register of personal investigation and study that it occupies a unique place in the upper cadre of the veterinary literature of this period. It departs from the orthodoxy in so many other respects that one's faith in the old authors is often shaken in digging into the text. The in-

tention is to make the reader "observe and think," the author says. Beautifully, *Veterinary Obstetrics* fulfills that desire. It makes the critic hesitate and halt and doubt, and seek in vain for logical contradictions, elsewhere. But who in this day anywhere in the world of veterinary medicine is qualified to do the contradicting? It is doubly apparent here that teachings clinched with critical studies and a broad experience are not easy to shatter by the plausible doctrines of yesterday, old and staid and traditional as so many of them are in the demesne of reproductive maladjustments in animals.

After completing the difficult task of attempting to review *The Diseases of the Genital Organs of Domestic Animals* (2nd edition, 1939) and *Veterinary Obstetrics* (3rd edition, 1940), it seems clear that the author of these classics has started a new school of thought on the physiopathology of reproduction in farm animals.

The opening chapters — anatomy and physiology—could be memorized to good advantage. Normal structure and function are affixed forthwith to their bearing upon obstetrics. The lieu where these concern the obstetrician is pointed out. The lumbar and obturator nerves, for example, cross promontories where they may be injured by an unyielding fetus passing through the pelvic path. Again, in the description of the uterus, the reader is reminded of the delicate thread upon which the life of the new being hangs. No mammalian embryo or fetus will grow without contact with the endometrium. Thus, the author sets down a new conception of the disputed question of extra-uterine pregnancy without even turning to the chapter on that subject. That is to say, instead of leaving the effects of normal conditions to the imagination, their relation to accidents of puerperium is singled out for attention, *sur place*.

The illustrations in these fundamental chapters were prepared in such a way as to bring out salient features to better advantage than the stereotyped drawings of the old authors. It is apropos to mention here that the illustrations of other chapters show painstaking effort in dissection, photography and engraving. Those on the fetal membranes of healthy and diseased cows, showing their morphology, physiognomy and vascular irrigation, are particularly impressive.

Works on animal obstetrics are about as old as veterinary literature itself, and the main reason for writing them was dystocia. Yet, as far as prevention and control are concerned, the author makes the startling statement that dystocia is "a field that has as yet attracted no material interest." Far from being an accident of parturition, dystocia may be ordained as far back as the espousal of sperm and ovum, and it may be overcome by proper measures.

The book is divided into six sections: Anatomy, Physiology, Physiological Birth, Dystocia, Wounds and Injuries, and puerperal diseases. These sections are subdivided into 35 chapters each of which has numerous subtitles. The choice of titles and their classification are in themselves a basic curriculum on animal obstetrics.

Milk fever is listed under toxemias of pregnancy and puerperium without, however, insisting that the placement has etiological significance. In fact, the abnormal chemistry of the affected cow's blood merely adds another alleged cause to a mysterious ailment. Inflation of the udder is described at length, intravenous therapy in a few words. The belief that mastitis more often follows inflation of the udder than the intravenous injections of the hour lacks proof. Inflation done with all of the rules of aseptic procedure is not a cause of mastitis. Mastitis may have preceded the treatment in both instances.

Attempting to squeeze a review of all of this material into limited space is as impossible as a sketchy review is more or less futile. *Veterinary Obstetrics* must be read and studied to be appreciated.

The book is not a rich hunting ground for the predatory critic. The author has been writing for too many years to fill white space with bad grammar. Literary errors are rare, vocabulary large and adjectives well chosen. In our budget, "obstetrist" instead of "obstetrician" is a

newcomer, obviously a colloquialism of the craft yet to be seized by the ulterior raconteur. But like the nimrod who hates to barge home empty handed after a day afield, we are prompted to signalize the use of a capital "T" for "thoroughbred." Since the word means a breed of horses, it is as much entitled to a "cap" as "Polled Angus." Although there is no general agreement in this respect among veterinary writers, uniformity stops all argument as to whether a breed of animals is a proper noun or not. Another slip, consecrated by usage, is the term "general consensus of opinion" which, according to the definition of "consensus," has three words too many. "Zoology," to be absolutely correct, needs a horizontal colon (= umlaut) on its second "o." Usage, however, is a logical argument in favor of the omission.

Inasmuch as pregnancy and its conclusion underwrite the success of animal production, it is not good strategy to blunder along in practice without the sound teachings of Williams—without the "last word" on a subject as important as obstetrics and the diseases related thereto. [*Veterinary Obstetrics. 3rd Edition. By W. L. Williams, emeritus professor, Cornell University. Published by the author, 209 White Park Road, Ithaca, N. Y. 466 pages. 105 illustrations. 4 colored plates. $6.50.*]

Proceedings of the Kansas State Association

The proceedings of the 1940 meeting of the Kansas State Veterinary Medical Association is a booklet of 120 pages compiled from the reporter's notes by Secretary Chas. W. Bower, prominent figure in state and national association work for many years. The booklet contains the roster of officers and committees, list of active members, financial report, and the details of a literary program containing addresses, lectures, papers and lively discussions on matters of local and general interest which are reviews by capable speakers of the modern conceptions of the diseases of horses, cattle, sheep, poultry and small animals of particular interest to Kansas practitioners.

The report is well edited and the text, covering important ground, is based upon the actual experiences of practice. Of particular importance is the report of the Relations Committee on the spreading of scabies among small farm flocks purchased at community sales through lack of systematic inspection and better methods of dipping.

A brief address by Governor Payne H. Ratner shows that the interest in veterinary science is attracting attention in high places and the keen interest in the discussions taken by Livestock Commissioner Will J. Miller throughout the meeting indicates that its proper application as a means of conserving farm animals is regarded as a matter of eminent concern. [*Proceedings of the Kansas State Veterinary Medical Association. Edited by Chas. W. Bower. Published by the Association. 1940. 120 pages.*]

More fats and vitamins and less carbohydrate in the diet prevents decay of the teeth.—*E. V. McCollum, Johns Hopkins University.*

Another bit of evidence tending to put equine periodic ophthalmia among avitaminoses is the curing of rosacea keratitis (in man) with riboflavin. *(Vide, Archives of Ophthalmology, May 1940.)*

The discovery of a new enzyme in the blood plasma, an esterase, is announced as a cure for drug addiction. As expressed in *Science News Letter*, "This esterase chemically blitzkriegs heroin and morphine."

The hospital, the practicing physician and the research laboratories are in my opinion the most important instruments in the future improvement of the well-being of the people of this nation.—*Governor Lehman before the AMA convention, 1940.*

THE NEWS

AVMA Activities

The Research Journal

The task of publishing a journal of research is under way. The first issue was mailed to the first list of subscribers on October 14. Without any precedent to point out or sample to exhibit to prospective subscribers, the mailing list of the initial number makes a creditable showing. Gratifying as the influx of subscribers was, the comments and helpful advice received since the first issue was examined by capable critics is still more agreeable. The success of the publication seems assured, for in the few weeks between the authorization of the venture and the press date of the first issue it was found that 1,500 copies had to be printed to supply the demand. This is regarded as a creditable showing in view of the fact that little time could be given to promoting the enterprise. The voluminous transcript of the Washington session had to be whipped into order for printing along with the contents of the regular journal, and this new journal, starting from the very beginning, had to be planned, edited, printed and mailed, without perhaps the amount of deliberation the undertaking should have been given. The material for future issues will be carefully classified and submitted to capable advisers for approval and criticism.

The receipt of over 600 subscriptions the first week and their constant arrival from day to day has removed much of the fear that too many copies might be printed. A limited number of copies are, therefore, available for members of the Association who desire to build up their files from No. 1 up. For members only, the subscription price remains $2.50 added to the annual dues for 1941.

Alumni Dinners of Washington Session Attracted Record Attendance

Under the chairmanship of A. E. Wight, the alumni dinners of the Washington session, held on August 27 at the Mayflower Hotel in Washington, D. C., attracted an attendance of 945—the largest number ever registered for that event at an AVMA convention.

The colleges represented and the number attending each dinner were as follows: Alabama Polytechnic Institute, 42; Chicago Veterinary College, 42; Colorado State College, 31; Cornell University, 147; George Washington University, 39; Harvard University, 5; Indiana Veterinary College, 17; Iowa State College, 51; Kansas City and St. Joseph veterinary colleges, 97; Kansas State College, 54; McKillip Veterinary College, 20; Michigan State College, 36; New York-American Veterinary College, 17; The Ohio State University, 160; Ontario, McGill and Montreal veterinary schools, 47; University of Pennsylvania, 105; U. S. College of Veterinary Surgeons, 27.

Report of Special Committee Appointed to Attend 13th U. S. Pharmacopoeial Convention

In compliance with [Past] President Way's appointment, the undersigned, as delegates representing the American Veterinary Medical Association, attended the 13th decennial meeting of the United States Pharmacopoeial Convention, held at the Hotel Willard, Washington, D. C., May 13-15, 1940. D. W. Ashcraft of Columbus, Ohio, also appointed as a delegate, was prevented by illness from being present.

The United States Pharmacopoeia had its inception 120 years ago and its first edition was prepared by a committee appointed for that purpose by a group of physicians who met in Washington, D. C., on January 1, 1820, and planned the policy of decennial revision which has since guided the policies of the publication. The first edition, Pharmacopoeia "I," was a comparatively small volume, but subsequent revisions have gradually been increased in size, the current volume (XI) containing almost 700 pages.

In 1850, the pharmaceutical profession was admitted to the convention and has increased its influence during the ensuing years. Although several of the earlier editions were prepared almost entirely by the convention itself, a committee of revision, elected by the convention, soon took over this gigantic decennial task. By custom this committee now consists of 17 members of the medical and 33 members of the pharmaceutical professions, and the actual work of revision is conducted largely by correspondence during the four or five years immediately following the decennial convention sessions.

The convention itself now confines its technical activities to certain pre-convention conferences held on the day preceding the opening, while the sessions of the convention proper are

given over largely to matters of business routine, election and general policies.

The 13th decennial convention had a membership of approximately 500 representatives of 186 organizations, including the medical departments of the Army and Navy, the U. S. Public Health Service, the federal departments of agriculture and commerce, various national and state medical and pharmaceutical associations, numerous schools and colleges of medicine and of pharmacy, the American Dental Association, the American Chemical Society and the American Veterinary Medical Association, to name but a few.

Due to the recent official adoption of the Spanish edition of the U. S. Pharmacopoeia by Cuba, Costa Rica, the Dominican Republic, Nicaragua and Panama, and the probability of its early adoption by Argentina, Bolivia, Ecuador, Peru, Chili, Colombia, Honduras and Uruguay, representatives of the medical and pharmaceutical professions of these nations also may participate in subsequent conventions. In fact, professional institutions of Cuba became components of the convention in 1920 and those of the Philippine Islands in 1930.

On May 13, the junior delegate (Mundhenk) attended the pre-convention conferences on statistical methods applied to biological assays, on vitamins, and on pharmacopoeial scope, therapeutics, nomenclature, etc. All technical matters of the convention are discussed in these conferences rather than on the floor of the convention proper and it is recommended that, in future conventions, all delegates be present for as many of these meetings as possible. As from two to six of the conferences are held in various rooms at the same hour, attendance at all is a physical impossibility even for a complete delegation of three.

On May 14, both delegates presented their credentials and were seated temporarily in the convention, pending passage of the constitutional amendment legalizing the admittance of the AVMA with the American Pharmaceutical Manufacturers' Association, the American College of Physicians, the American College of Surgeons, the American Hospital Association and The Rockefeller Institute for Medical Research.

The amendment in question was adopted at the afternoon session. In addition to the formal roll call and other routine matters, the program of the first day included the president's address and a review of pharmacopoeial affiliations by Morris Fishbein for the medical profession, E. F. Kelly for the pharmaceutical profession and W. G. Campbell for the Food and Drug Administration. Memorials, reports of various officers and committees, and other minor matters concluded the session.

The Nominating Committee, composed of one representative from each of the 186 component organizations, met at 9:00 p. m. and, first as a single committee, nominated individuals for the various offices of the convention; later, in separate caucuses of the medical and pharmaceutical groups, the committee nominated 17 individuals from the former profession and 33 from the latter, for the Committee of Revision. The senior delegate was unable to be present at the meeting of the Nominating Committee and, therefore, the Association was represented by the junior delegate. After division into caucuses, due to the absence of precedent, instructions or objection, and because of a considerable number of personal acquaintances among the pharmaceutical members, your delegate joined the pharmaceutical group. In the caucus of this group he placed in nomination for the Committee of Revision the name of H. E. Moskey. Dr. Moskey received a creditable vote but was not nominated.

The session of Wednesday, May 15, was given largely to the secretary's report, various resolutions, to election and installation of officers and the Committee of Revision, and to minor items of business.

In the organization meeting of the Committee of Revision following adjournment of the convention proper, E. Fullerton Cook was reëlected chairman. In a conversation Dr. Cook expressed himself as personally welcoming the veterinary profession to participation in the 120-year-old organization and stated that he would later communicate with the Association on matters of revision pertaining to the profession, possibly through a group which he might later request to be designated by the AVMA and probably to be known as the United States Pharmacopoeial Veterinary Advisory Board.

Your delegate expressed to Dr. Cook the appreciation of the AVMA for his courtesy and assistance in effecting the contacts which resulted in the Association's becoming a component organization of the convention and discussed briefly with him the relations of the Pharmacopoeia to the veterinary profession.

The highlights of the convention may be stated as follows:

1) Steps were taken to bring about the modernization and speeding up of the proceedings of future conventions or of subsequent sessions of the present one, by relaxation of the stringent requirements surrounding the adoption of constitutional amendments and by passage of a resolution setting up a special committee for revising the constitution and by-laws. This resolution, as adopted, calls for "suitable and proportional representation for medicine, pharmacy, dentistry, veterinary medicine, governmental agencies and manufacturing pharmacy."

2) Realization, by the convention, of the increased responsibility placed upon the Pharmacopoeia and its framers by the passage of the recent Food, Drug, and Cosmetic Act,

which in effect places the publication in the position of a federal statute. This responsibility was also greatly increased by the recent official adoption of the Pharmacopoeia by five of our sister American republics and its probable early adoption by eight others.

3) Consideration of the desirability of issuing revisions more often than decennially, as heretofore, or at least of continuing the present policy of issuing interim revision supplements as needed. These points are of particular importance in view of the rapid development of new therapeutic agents and of improved methods for the assay, preservation, etc., of pharmacopoeial products.

4) Recognition of the desirability of a full-time executive staff and a permanent Washington headquarters for the organization.

The Journal of the American Medical Association for May 25, 1940, stated editorially, "The Pharmacopoeial Convention of 1940 represents the fruitful union of the most progressive elements of both medicine and pharmacy and should result in the production of the best pharmacopoeia in the world."

In conclusion, your delegates wish to express to the Association their appreciation of having been the first official representatives of the veterinary profession in this important institution, and to recommend that, in the convention of 1950, to assure a complete representation, not only three delegates, but also three alternates be designated.

Very respectfully,
(Signed) H. E. MOSKEY,
R. L. MUNDHENK.

"Exchange Forbidden"

Back to the executive office comes an envelope containing the August 1940 issue of the JOURNAL, addressed to an honorary member in France. It bears the stamp "Retour, l'échange supprimé" (Return, exchange forbidden), and was mailed from Stockholm, Sweden.

Attention, Secretaries of Constituent Associations

To insure listing of news of your association, information must be sent to the JOURNAL not later than the 15th of the month preceding the month of issue.

APPLICATIONS

First Listing*

ALTER, WAYNE
St. Paul, Ind.
D.V.M., Indiana Veterinary College, 1918.
Vouchers: Chas. W. Fisher and J. L. Axby.

BALLANTYNE, JOHN HUBER
366 Keele St., Toronto, Ont.
B.V.Sc., V.S., Ontario Veterinary College, 1939.
Vouchers: W. Moynihan and G. A. Rose.

BROWN, EARL FREDERICK
Manilla, Ind.
D.V.M., Ohio State University, 1938.
Vouchers: J. C. Schoenlaub and W. A. Sullivan.

CLORE, EARL E.
Greenwood, Ind.
D.V.M., Cincinnati Veterinary College, 1915.
Vouchers: W. A. Sullivan and J. L. Axby.

DOHM, WILLIAM H.
Roslyn, L. I., N. Y.
D.V.M., Cornell University, 1922.
Vouchers: Frederic F. Fehr and Herman Tax.

FINCH, CLYDE F.
Star Route, New Albany, Ind.
D.V.M., Indiana Veterinary College, 1915.
Vouchers: W. A. Sullivan and J. L. Axby.

FOUST, J. W.
Hope, Ind.
D.V.M., Indiana Veterinary College, 1917.
Vouchers: Chas. W. Fisher and J. L. Axby.

ISENBERG, C. G.
1201 N. Youngs Blvd., Oklahoma City, Okla.
D.V.M., Kansas State College, 1933.
Vouchers: C. H. Fauks and Fred M. Shigley.

LETT, WILLIAM S.
414 W. Cherry St., Scottsburg, Ind.
D.V.M., Indiana Veterinary College, 1914.
Vouchers: W. A. Sullivan and J. L. Axby.

MELTON, JOHN F.
3717 Hamilton Ave., Dallas, Texas.
D.V.M., Texas A & M College, 1937.
Vouchers: J. S. Grove and F. W. Brundrett.

MILLER, RALEIGH A.
2120 N. E. St., Richmond, Ind.
D.V.M., Indiana Veterinary College, 1917.
Vouchers: Chas. W. Fisher and J. L. Kixmiller.

MURRAY, CHAS.
Seymour, Ind.
V.M.D., Indiana Veterinary College, 1909.
Vouchers: Chas. W. Fisher and J. L. Axby.

NOAH, R. F.
P. O. Box 872, Riverton, Wyo.
D.V.M., Colorado State College, 1937.
Vouchers: H. D. Port and G. H. Good.

*See July 1940 issue, page 73.

O'CONNOR, WILLIAM PETER
366 Keele St., Toronto, Ont.
B.V.Sc., Ontario Veterinary College, 1939.
Vouchers: G. A. Rose and Frank J. Cote.

PALMER, WALTER J.
333 N. Audubon Rd., Indianapolis, Ind.
D.V.M., Cincinnati Veterinary College, 1909.
Vouchers: Harry Seevers and W. A. Sullivan.

PAULISH, WM. F.
Franklin, Ind.
D.V.M., Indiana Veterinary College, 1916.
Vouchers: Chas. W. Fisher and J. L. Axby.

PITTINGER, WM. T.
7655 Dix Ave. at Central, Detroit, Mich.
D.V.M., Grand Rapids Veterinary College, 1916.
Vouchers: F. D. Egan and Eugene B. Ingmand.

ROBERTSON, HELEN MARY
Coventry Farm, Princeton, N. J.
M.R.C.V.S., Royal College of Veterinary Surgeons, 1938.
Vouchers: J. G. Hardenbergh and J. R. Porteus.

ROTH, GUSTAV F.
Crown Point, Ind.
D.V.M., Indiana Veterinary College, 1917.
Vouchers: J. L. Axby and W. A. Sullivan.

SHAVER, LEON E.
Box 73, Brownstown, Ind.
D.V.M., Indiana Veterinary College, 1918.
Vouchers: Chas. W. Fisher and J. L. Axby.

STEINMETZ, R.
Southport, Ind.
D.V.M., Cincinnati Veterinary College, 1912.
Vouchers: W. A. Sullivan and C. H. Herrold.

TALBERT, MELLIS GRANT
250 E. Madison, Franklin, Ind.
D.V.M., Indiana Veterinary College, 1915.
Vouchers: Chas. W. Fisher and J. L. Axby.

TODD, LEWIS K.
Rt. 2, Box 3, Tacoma, Wash.
D.V.M., State College of Washington, 1937.
Vouchers: C. M. Saunders and R. A. Button.

TUCKER, WELLBOURNE S.
Waldron, Ind.
D.V.M., Indiana Veterinary College, 1902.
Vouchers: Chas. W. Fisher and W. A. Sullivan.

TURNER, DELVER O.
200 N. Home Ave., Franklin, Ind.
D.V.M., Indiana Veterinary College, 1913.
Vouchers: Chas. W. Fisher and W. A. Sullivan.

WIEST, M. A.
Botkins, Ohio.
D.V.M., Cincinnati Veterinary College, 1920.
Vouchers: W. F. Guard and R. E. Rebrassier.

Second Listing

Anderson, Wayne A., 1809 W. 9th St., Anderson, Ind.
Bartels, George H., Main Rd., Millville, N. J.
Blackberg, S. N., Nutrition Research Labs., 332 S. Michigan Ave., Chicago, Ill.
Carter, Joel Herbert, Jr., Castleberry, Ala.
Caspar, F. A., 1001 River Cove, Sulphur Spring Sta., Tampa, Fla.
Cullen, Wm. C., 328 S. 2nd St., Mankato, Minn.
Darby, R. N. Gordon, 220 E. High St., Somerville, N. J.
Davis, Howard B., 31 Ardmore Rd., W. Hartford, Conn.
Dufresne, Joseph, Oka, Quebec.
Edwards, Richard Cox, Quarryville, Pa.
Emick, Harry F., 2345 Central Ave., Indianapolis, Ind.
Fallon, Harry J., 418-22 9th St., West, Huntington, W. Va.
Folger, G. C., Mt. Vernon, Wash.
Goldbrown, Jacob, 2259 Milburn Ave., Maplewood, N. J.
Gordon, W. D., 780 S. 8th St., San Jose, Calif.
Hamilton, Cecil M., 9100 Kercheval Ave., Detroit, Mich.
Height, Vernon B., 607 Asbury Ave., Asbury Park, N. J.
Hess, Egbert S., Kentland, Ind.
Hicks, Leo Henry, Rocky Mountain, N. Car.
Hose, E. M. J., 316 N. Henry St., Richmond, Va.
Houchins, George L., Martinsville, Va.
James, D. E., 119 Cuyler Ave., Trenton, N. J.
Johnson, Norman Henry, c/o A.S.P.C.A. Hospital, Avenue A & 24th St., New York, N. Y.
Juliand, Louis, Box 264, Greene, N. Y.
Kerans, Robert G., 2590 Duckcreek Rd. at Smith Rd., Cincinnati, Ohio.
Lancaster, Vaughan C., New Castle, Del.
Lower, H. C., 306 W. Main St., Waynesboro, Pa.
Mayer, Frederick B., 203 E. Main St., Canton, Pa.
McDonough, J. P., 311 N. Henry, Richmond, Va.
Miller, Earl W., 209 S. Green St., Longview, Texas.
Newton, T. E., James Hotel, Auburn, Ala.
Nusser, Wm. A., 824 Fidelity Bldg., Baltimore, Md.
Reeder, Carr Y., Eldorado, Ill.
Richardson, Gerald C., 189 S. Jefferson, Martinsville, Ind.
Rochfort, Robert F., South Sterling, Pa.
Schofield, F. W., Guelph, Ontario.
Schuler, Clarence A., c/o Wilmington Provision Co., Wilmington, Del.
Sweet, J. D., River St., Chateaugay, N. Y.
Swink, Clarence E., Dunnell, Minn.
Wann, R. W., Wingate, Ind.
Wilbanks, C. S., Gaithersburg, Md.
Zacherle, Geo. H., Jr., 8321 Shawnee St., Philadelphia, Pa.

U. S. GOVERNMENT

Encephalomyelitis—1940

According to a USDA release, approximately 4,500 cases of equine encephalomyelitis occurred during the 1940 season, as compared with 3,929 cases in 1936, 173,889 in 1937, 184,000 in 1938, and approximately 8,000 in 1939.

Of particular interest was the appearance of more than one half of the 1940 cases during late September and early October. In general, the results obtained through the use of the new intradermic method were satisfactory. However, little vaccination was practiced as compared with previous years on account of the low incidence of the disease in 1939 and the tendency of farmers to wait until the disease made its appearance.

Junior Veterinarians Sought for Government Work

The U. S. Civil Service Commission has announced an open competitive examination to secure qualified persons to fill the position of junior veterinarian in the Bureau of Animal Industry. The salary is $2,000 a year less a retirement deduction of 3.5 per cent.

Applications must be filed with the Commission's Washington office not later than November 12 if received from states east of Colorado and not later than November 15 if received from Colorado and states westward.

Further information regarding the requirements for these positions, and application forms, may be obtained from the secretary of the Board of U. S. Civil Service Examiners at any first- or second-class post office or from the U. S. Civil Service Commission, Washington, D. C.

Regular Army

Captain William F. Collins is relieved from assignment at the New York Port of Embarkation, Brooklyn, N. Y., effective August 29, 1940, and is assigned to Fort Preble, Maine. He is assigned to temporary duty at the New York Port of Embarkation for a period of approximately three months and, upon completion of this duty, will proceed to Fort Preble, Maine, and report for duty.

Lt. Colonel Samuel G. Kielsmeier is relieved from assignment and duty at Fort Oglethorpe, Ga., and assigned to duty at the Presidio of San Francisco, Calif. He will proceed at the proper time to Charleston, S. Car., and sail on the transport scheduled to leave that port on or about September 16, 1940, for San Francisco and, upon arrival, will report for duty.

Captain John K. Allen is relieved from assignment and duty at the Army Medical Center, Washington, D. C., effective upon his return from temporary duty at Camp Perry, Ohio, in connection with the National Matches on or about September 21, 1940, is assigned to station at Fort Myer, Va., and will report to the commanding officer, General Dispensary, United States Army, Washington, D. C., for temporary duty for approximately three months, in addition to acting as attending veterinarian, Bolling Field and Army War College, and upon completion of this temporary duty will proceed to Fort Myer and report for duty.

Veterinary Corps Reserve

First Lieut. Edwin J. Smith is relieved from assignment and duty at the Chicago Quartermaster Depot, Chicago, Ill., effective on or about October 1, 1940, and assigned to the New Orleans Quartermaster Depot, New Orleans, La., for duty.

First Lieut. Edwin J. Watson, now on duty at the Presidio of Monterey, Calif., has been designated as veterinarian on the U.S.A.T. Meigs for trips to Panama on or about October 9, 1940, and to the Philippines on or about November 12, 1940.

The following veterinary reserve officers (first lieutenants unless otherwise indicated) were ordered to extended active duty during the month of September and assigned to stations indicated:

Benjamin D. Blood, Hq., North Central Remount Area, Kansas City, Mo.

Wilfred S. Bentham, Fort Mason, Calif.

Captain Nels F. Christensen, Fort Robinson Quartermaster Depot, Fort Robinson, Neb.

John E. Craige, General Dispensary, U. S. Army, Philadelphia, Pa.

Fernley W. Duey, Fort Snelling, Minn.

Captain Richard E. Geisler, Fort Douglas, Utah.

Arthur C. Herzberger, Hq., Southwestern Remount Area, Colorado Springs, Colo.

Raymond R. Houser, Hq., East Central Remount Area, Lexington, Ky.

Harold D. James, Fort Hayes, Columbus, Ohio.

Captain George A. Kuhn, Jefferson Barracks, Mo.

Henry J. Lindenstruth, Fort Snelling, Minn.

H. M. Marlowe, Presidio of Monterey, Calif.

Leslie C. Murphy, Chicago Quartermaster Depot, Chicago, Ill.

Clifford H. Milks, Westover Field, Mass.

Oliver W. Orson, Fort Bliss, Texas.

Joseph S. Ruhe, Front Royal Quartermaster Depot, Front Royal, Va.

Rowland W. Rushmore, Fort Benning, Ga.

Claude O. Wilder, Fort Benning, Ga.

Ernest St. John Watkins, Hq., Northwestern Remount Area, Fort Douglas, Utah.

George H. Zacherle, U. S. Military Academy, West Point, N. Y.

Veterinarians Sounded a Warning on National Defense 61 Years Ago

Speaking at the Bicentennial Celebration of the founding of the University of Pennsylvania, Alumnus John R. Mohler, chief of the Bureau of Animal Industry, U. S. Department of Agriculture, reminded his audience that the current national defense program was forecast by James Law of Cornell University 61 years ago when he urged Congress to defend the United States and its possessions against disease enemies as well as against the one "who attacks us with fire and sword."

Delving into the history of veterinary science, Dr. Mohler reviewed the benefits to human welfare of increasing mastery over animal diseases. Among these benefits have been contributions to human medicine and to industrial development, and many cases of effective coöperation between the federal government and states.

It was on the importance of strong, central authority to provide national security, however, that Dr. Law set the example of foresighted statesmanship quoted in Dr. Mohler's address in Philadelphia. Referring to the foreign cattle disease, pleuropneumonia, which had invaded the United States and was ravaging its herds, Dr. Law said in 1879: "It matters little whether controlled by state or national government, if vigor and uniformity of action can be secured; but since much combined and unflagging work is necessary, it could be best controlled by an intelligent, central authority. The United States government is as much called upon to defend her possessions against an enemy like this—so implacable, so relentless—as against the less insidious one who attacks us openly with fire and sword. Let the national congress consider this well." Congress heeded the admonition in which other veterinarians joined and in a few years the disease was destroyed and has never returned.

Dr. Mohler pointed out also that "every country has a right to protect itself by appropriate measures against diseases known to be present in other countries. This is in harmony with the fundamental law of self-preservation." The speaker explained that in international veterinary congresses held in different parts of the world, delegates have agreed on such self-protection as a fundamental point in wise national administration. At the same time veterinary officials of the different countries coöperate in acquainting each other with the essential information on the presence of disease dangers, thereby aiding each country to develop sound policies for its protection.

Dr. Mohler advised that scientific knowledge, although utilized chiefly by professional workers, should be made readily available to interested laymen and others concerned. He mentioned free speech and a free press as basic requirements for the dissemination of knowledge. "I say this," he emphasized, "not only because advancement of science depends on public support and understanding, but also because it is the right thing to do. Science is basically altruistic."

AMONG THE STATES

Canada

Out of 8,553 members of the Canadian Medical Association more than 90 per cent placed their services at the disposal of the war department of the Dominion. The 800 or so who did not thus register proffered rational reasons: age, physical disability, etc.

Florida

Dairymen were told by the *Florida Grower* (Sept. 1940) that citrus pulp is the equal of beet pulp in the ration of dairy cows, and is better in maintaining milk production. In regard to increase in weight, beet pulp, however, made the better showing.—*Daily Digest, USDA.*

Idaho

H. R. Groome, practitioner of Twin Falls, reports the spread of hog cholera through sales rings in his section of the state.

S. E. Nelson of Preston recently reported a number of death losses in range cattle from anthrax. At the time of the outbreak the cattle were pasturing on swampy ground. With the infection showing up in this type of soil it is feared that it will remain in the soil and may spread to other sections of the state. The intradermal spore vaccine was used.

Incidentally, Drs. Groome and Nelson, both old-time leading practitioners in the state, suffered illness recently which confined them to their homes, but they are now well on the way to recovery.

A. K. KUTTLER, *Resident Sec'y.*

Illinois

The Department of Public Health in its coöperative program with the federal government abated the pollution of 104 miles of rivers and

other major streams last year, made 500,000 diagnostic tests, saved the people over $100,000 in serums and vaccines, analyzed 102,000 samples of water, and supervised the construction of 11,000 sanitary privies by WPA workers. Additional work was making 26,000 examinations of children of pre-school age, testing 2,250 high-school students for tuberculosis and examining 1,800 expectant mothers for their maternity health and 65,000 school children for dental troubles.

It is claimed that in the state-federal health program Illinois stands first.

• • •

Representatives of the state association met with officials of several state departments in Springfield, September 29, to discuss the proposed plan of reorganizing the veterinary service. Those in attendance were President Lucas, Secretary Hastings and two members of the special Committee on Legislation: Campbell (D. M.) and Henley. The prospect of enacting the necessary legislation at the 1941 session of the legislature will depend upon the attitude of the political lineup following the November election.

• • •

Emigration from the state during the last ten years, according to the federal bureau of census, exceeded immigration. Though the state gained 3.2 per cent since 1930 the increment was due to the excess of births over deaths.

• • •

The first fall meeting of the Eastern Illinois Veterinary Medical Association was held at the Urbana-Lincoln Hotel in Urbana, September 30. Approximately 30 members and their wives attended.

D. E. Sisk of Mansfield, president of the Association, and Robert Graham of the University of Illinois, Urbana, presented reports on the Washington session of the AVMA. B. J. Errington of the University of Kentucky, Lexington, Ky., spoke on problems encountered in raising Thoroughbreds in the Blue Grass region of his state. J. SAMPSON, *Secretary.*

Kansas

Another in the series of small group meetings was held at Valley Falls, October 10, with J. J. Harmon, D. M. Dill and E. A. Rippetoe as the local hosts. L. M. Roderick of Manhattan gave a talk on sheep diseases which was followed by a discussion of other timely subjects.

Eighteen veterinarians attended, and refreshments were served by the ladies at the close of the meeting. R. F. COFFEY, *Resident Sec'y.*

Michigan

Volume VII, No. 2 of *The Michigan Veterinarian* is a four-page leaflet giving the news of the profession of the state. This society organ is edited by E. C. W. Schubel of Blissfield, secretary of the state association, onetime assistant secretary of the AVMA.

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The poultry schools sponsored by Michigan State College and conducted by E. S. Weisner of that institution represent a sustained effort to interest practitioners in poultry practice and to qualify them for that expansion of the veterinary service. These schools (*Mich. Vet.*, October 1940) for the coming year will be opened at Adrian, December 3, 1940, and at Coldwater, December 6. Other meetings will follow. The consensus is that Dr. Weisner is doing an excellent job of bringing poultrymen and veterinarians into mutual understanding as to the part veterinary science should be playing in poultry production.

Nebraska

H. W. Schoening, chief of the pathological division of the federal bureau of animal industry, was the principal speaker at a swine-erysipelas conference held at the University of Nebraska, September 28 and 29, 1940. Among many prominent veterinarians who participated in the conference were Van Es, Jelen, Koen, Barger, Giffe, Peterman, Carter, Deppard and Murdock—all well-known figures in swine-erysipelas studies. The simultaneous antigen-serum prophylaxis was considered in view of the increasing occurrence of the disease. The discussion on the duration of the immunity produced appears to show that, except in badly infected premises, swine are protected for a year by this method of vaccination. Six months or less may, however, be the limit of the protection where the infection is grave or the resistance is lost from various causes.

Other swine diseases from which erysipelas must be differentiated were pointed out.

Writes the Association's secretary for Nebraska, J. E. Weinman: "Those who took the opportunity of attending this conference were delighted with the program carried out. These meetings are a revival for practitioners and they benefit the breeders of live stock and the public, which is the ultimate beneficiary. Man, like the mouse, can carry on only to the extent he is fed."

New Mexico

At the annual meeting of the New Mexico Veterinary Medical Association, held in Albuquerque, September 26-27, R. M. Olbeter of Clayton was elected president; S. W. Wiest of Santa Fe, vice-president; and F. H. Sharp of Albuquerque, secretary-treasurer (reëlected).

F. C. Harbaugh of Lubbock, Texas, and

Colonel D. B. Leininger of Fort Bliss, Texas, were the guest speakers.

T. I. MEANS, *Resident Sec'y.*

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Cattle carrying Australian ticks have been found in New Mexico. The animals carrying them were supposedly smuggled across the Rio Grande.

The Australian tick is a more dangerous spreader of Texas fever than the North American species because it can complete its life cycle on deer and hogs. The deer, especially, is apt to become a factor in spreading the Australian visitor over American pastures should it gain a foothold north of the international boundary. The ever-watchful BAI, says a southwestern correspondent, is on guard against the dire results of this new menace.

New York

Before a capacity crowd of 5,000 at the World's Fair grounds, October 4, Dr. George McAneny, president of the American Museum of Health, was awarded the Distinguished Public Service medal presented by the B. F. Goodrich Company, in recognition of his contributions to public health education. The American Museum of Health will open in 1941 in the building occupied by the Masterpieces of Art Museum on the Fair site, where it will remain permanently as a monument of the medical profession.

North Carolina

Three North Carolina veterinarians have been called away to join National Guard troops. They are Major A. H. Kerr, Captain C. A. Ferguson and Lieutenant W. M. Osteen. Others are expected to be called in a short time.

J. H. BROWN, *Resident Sec'y.*

Ohio

Each year, on the occasion of the Ohio state fair, the Ohio State Veterinary Medical Association offers a series of prizes to 4-H Club members, Future Farmers of America and students of vocational agriculture.

One $5 cash prize is given to the person winning the greatest number of points in swine, one to the person winning the greatest number of points in sheep, one to the winner of the largest number of points in dairy cattle, and one to the person securing the largest number of points in beef cattle—all pertaining to exhibits at the Ohio state fair.

For Future Farmers of America and Vocational Agriculture, the Association offers a $5 cash prize for each of the above groups and, in addition, one in poultry, making a total of nine $5 prizes in the two groups.

Then a $5 sweepstakes prize is given to the winner of the most points in the entire junior fair livestock exhibit.

Pennsylvania

The following men were elected to office at the recent annual meeting of the Pennsylvania State Veterinary Medical Association: J. F. Shigley of State College, president; R. Snyder of Philadelphia, first vice-president; William Boyd of Sewickley, second vice-president; C. P. Bishop of Harrisburg, third vice-president; W. Graham Love of Philadelphia, corresponding secretary; John D. Beck of Philadelphia, recording secretary; and William Ivens of Philadelphia, treasurer. Elected to the board of trustees were John Turner of Wellsboro, H. P. Prothero of Johnstown, F. H. Schneider of Philadelphia, Ernest Hogg of Wilkes-Barre and H. R. Church of Harrisburg.

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The third National Pulling Contest was held at Harrisburg, October 17, in connection with the National Dairy Show. Dan Arnold of Plainfield, Mich., won first prize in the heavyweight class with a pair of geldings weighing 4,418 lb. Second prize was won by Wm. Crail of Pioneer, Ohio, and third by J. C. Rhea of Worthington, Pa.

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The Philadelphia County Medical Society, through its Committee on National Defense, is sponsoring a series of lectures for physicians, dentists and veterinarians covering various aspects of medical preparedness and medical war services. These lectures are offered each Thursday afternoon at the Society's headquarters, 21st and Spruce Sts., Philadelphia, and are open to veterinarians. The speakers include many prominent army medical officers and outstanding medical civilians.

The Keystone Veterinary Medical Association is affiliated with the Society in sponsoring this program and extends an invitation to all veterinarians to attend these talks. For those who are unable to be present during these programs, the speeches are broadcast at 4:45 p. m. over local stations. Veterinarians are represented on the Committee on National Defense by A. Henry Craige, Jr., secretary-treasurer of the Keystone association.

South Carolina

B. C. Talley (O.S.U. '15) of Bennettsville, captain in the medical administration corps and one of the eight members of the state military department's staff, was recently called into active service, to assist in administering the draft.

Dr. Talley was among the first to go from Malboro county (S. Car.) into World War duty, serving with distinction in the second division

of the regular army. He was wounded in action and was twice decorated.

Tennessee

For the month of September 1940, State Veterinarian Topmiller reported 19 outbreaks of erysipelas in 13 counties, 4 outbreaks of blackleg in 4 counties, 2 outbreaks of hemorrhagic septicemia in 2 counties, and 28 outbreaks of hog cholera in 10 counties.

Vermont

Vermont is starting on its second three-year test for tuberculosis by counties since becoming a modified accredited area. Also, there are three or four men in the field on Bang's disease work.

G. N. WELCH, *Resident Sec'y.*

West Virginia

The West Virginia Veterinary Medical Association held its annual meeting in the Kanawha Hotel, Charleston, October 8-9.

The guest speakers were Leonard W. Goss of The Ohio State University, Columbus, Ohio; Elmer Lash, assistant chief of the tuberculosis eradication division, U. S. bureau of animal industry, Washington, D. C.; and P. D. Strausbaugh, professor of botany, West Virginia University, Morgantown.

I. H. Maxwell of Lost Creek was elected president; R. M. Johnson of Charleston, vice-president; and J. H. Rietz of Morgantown, secretary-treasurer.

S. E. Hershey of Charleston was elected delegate to the House of Representatives of the national association, and H. M. Newton of Charleston, alternate.

J. H. RIETZ, *Secretary.*

Wisconsin

The College of Agriculture of the University of Wisconsin, Madison, has announced that vegetable oils have less nutritive value in laboratory animals than butterfat tested against corn, soy bean, coconut and cottonseed oils. The rate of growth was greater on a butterfat diet than when these oils were fed with skimmed milk. Moreover, the gains were more economical.

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There was a meeting of the Northwestern Wisconsin Veterinary Medical Association at the Falck Hotel in Seymour, September 11. The afternoon session was devoted to a discussion of bovine mastitis. D. M. Campbell of Chicago, Ill., editor of *Veterinary Medicine*, and V. S. Larson of Madison, chief of the state division of livestock sanitation, were guest speakers at a banquet that concluded the meeting.

The Central Wisconsin Veterinary Medical Association also held a meeting on September 11, at La Crosse. The group was entertained by C. M. Heth of that city. A clinic, with special emphasis on poultry, was the principal feature. Ray C. Klussendorf of Madison and Alfred Gunderson, M.D., of La Crosse were the guest speakers. Dr. Gunderson spoke on methods of operation in humans, illustrating his talk with colored pictures.

JAMES S. HEALY, *Resident Sec'y.*

COMING MEETINGS

St. Louis District Veterinary Medical Association. 7800 Olive St. Rd., St. Louis, Mo. November 1, 1940. J. P. Torrey, secretary, 555 N. 14th St., East St. Louis, Ill.

Small Animal Hospital Association. Los Angeles, Calif. November 5, 1940. W. K. Riddell, secretary, 3233 W. Florence Ave., Los Angeles, Calif.

New York City, Veterinary Medical Association of. Hotel New Yorker, New York, N. Y. November 6, 1940. J. J. Merenda, secretary, 136 W. 53rd St., New York, N. Y.

Dallas-Fort Worth Veterinary Medical Society. Fort Worth, Texas. November 7, 1940. R. L. Rogers, Jr., secretary, Route 2, Gordon, Texas.

Houston Veterinary Association. Houston, Texas. November 7, 1940. W. T. Hufnall, secretary, 1612-14 E. Alabama Ave., Houston, Texas.

Poultry School for Graduate Veterinarians in Missouri (Missouri Veterinary Medical Association and University of Missouri College of Agriculture coöperating). Veterinary Bldg., University of Missouri, Columbia, Mo. November 7-8, 1940. J. L. Wells, secretary, 1817 Holmes St., Kansas City, Mo.

Ak-Sar-Ben Veterinary Medical Association. Fontenelle Hotel, Omaha, Neb. November 11, 1940. J. D. Ray, secretary, 1124 Harney St., Omaha, Neb.

Chicago Veterinary Medical Association. Hotel Sherman, Chicago, Ill. November 12, 1940. G. S. Elwood, secretary, 5449 Broadway, Chicago, Ill.

Southeastern Michigan Veterinary Medical Association. Medical Arts Bldg., 3919 John R St., Detroit, Mich. November 13, 1940. F. D. Egan, secretary, 17422 Woodward Ave., Detroit, Mich.

Southern Veterinary Medical Association. Tutwiler Hotel, Birmingham, Ala. November 13-15, 1940. L. A. Mosher, secretary, Box 1533, Atlanta, Ga.

Mississippi Valley Veterinary Medical Association. Hotel Custer, Galesburg, Ill. November 14-15, 1940. L. A. Gray, secretary, Bushnell, Ill.

Kansas City Veterinary Medical Association. Kansas City, Mo. November 18, 1940. S. J. Schilling, secretary, Box 167, Kansas City, Mo.

San Diego County Veterinary Medical Association. Zoölogical Research Bldg., Balboa Park, San Diego, Calif. November 18, 1940. Paul D. DeLay, secretary, State Poultry Pathological Laboratory, Balboa Park, San Diego, Calif.

Massachusetts Veterinary Association. Hotel Westminster, Boston, Mass. November 20, 1940. H. W. Jakeman, secretary, 44 Bromfield St., Boston, Mass.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. November 20, 1940. Charles Eastman, secretary, 725 S. Vancouver Ave., Los Angeles, Calif.

Arizona Veterinary Medical Association. Adams Hotel, Phoenix, Ariz. November 22-23, 1940. Donald Miller, secretary, Arizona State Laboratory, Arizona State Bldg., Phoenix, Ariz.

Keystone Veterinary Medical Association. University of Pennsylvania, Philadelphia, Pa. November 27, 1940. A. Henry Craige, Jr., secretary, University of Pennsylvania, Philadelphia, Pa.

American Veterinary College Deans. Palmer House, Chicago, Ill. December 3, 1940.

United States Live Stock Sanitary Association. Morrison Hotel, Chicago, Ill. December 4-6, 1940. Mark Welsh, secretary, College Park, Md.

South Dakota Veterinary Medical Association. Carpenter Hotel, Sioux Falls, S. Dak. December 12-13, 1940. G. E. Melody, secretary, Gettysburg, S. Dak.

California Veterinary Conference (under joint sponsorship of California State Veterinary Medical Association and University of California). Davis, Calif. January 6-8, 1941. Further information may be secured from C. M. Haring, Division of Veterinary Science, University of California, Berkeley, Calif.

Kansas Veterinary Medical Association. Kansas State College, Manhattan, Kan. January 8-9, 1941. Charles W. Bower, secretary, 1128 Kansas Ave., Topeka, Kan.

Cornell University Annual Conference for Veterinarians. New York State Veterinary College, Ithaca, N. Y. January 8-10, 1941. W. A. Hagan, dean, New York State Veterinary College, Ithaca, N. Y.

Ohio State Veterinary Medical Association. Deshler-Wallick Hotel, Columbus, Ohio. January 8-10, 1941. R. E. Rebrassier, secretary, The Ohio State University, Columbus, Ohio.

Tennessee Veterinary Medical Association. Noel Hotel, Nashville, Tenn. January 20-21, 1941. A. C. Topmiller, secretary, 530 W. Main St., Murfreesboro, Tenn.

Michigan State College Post-Graduate Conference for Veterinarians. Michigan State College, East Lansing, Mich. January 27-February 1, 1941. Ward Giltner, dean, Division of Veterinary Science, Michigan State College, East Lansing, Mich.

Ontario Veterinary Association. Royal York Hotel, Nashville, Tenn. January 20-21, 1941. W. J. Rumney, secretary, 612 King St., W., Hamilton, Ont.

State Board Examinations

Illinois State Board of Veterinary Examiners. Chicago, Ill. December 9-10, 1940. Applicants will secure blanks and instruction as to fee, qualification, hours and address of examination room from the Superintendent of Registration, Department of Registration and Education, Springfield, Ill.

Maine State Board of Veterinary Examiners. January 8, 1941. Further information may be obtained from the secretary, S. W. Stiles, Falmouth Foreside, Maine.

PERSONAL NOTES

Births

To Dr. (K.S.C. '33) and Mrs. C. J. Prchal of Omaha, Neb., a son, Charles Ross, August 15, 1940.

To Dr. (U.P. '37) and Mrs. Russell E. Edmonds of Trenton, N. J., a son, Arthur McChesney, July 28, 1940.

To Dr. (Ohio '34) and Mrs. David E. James of Trenton, N. J., a son, David Robert, May 22, 1940.

To Dr. (U.P. '34) and Mrs. Alfred Kissileff of Flourtown, Pa., a son, Harry R., June 1 1940.

To Dr. (Colo. '33) and Mrs. Everett J. Siemer of El Paso, Texas, a son, August 5, 1940.

To Dr. (U.P. '36) and Mrs. Albert L. Opp of Cristobal, Canal Zone, a son, Gerald Lewis, August 26, 1940.

To Dr. (Wash. '39) and Mrs. Loris O. Johnson of San Jose, Calif., a daughter, Judith Lynn, March 7, 1940.

Marriages

Frank Wilhite (Iowa '34) of Atlanta, Ga., to Francis Peek of Oxford, Ga., July 6, 1940.

V. L. Tharp (O.S.U. '40) of Hemlock, Ohio, to Grace L. Drumheller, July 20, 1940.

Raymond L. McMahan (K.S.C. '38) of Lima, Ohio, to Mary L. Hover of Lima, Ohio, August 11, 1940.

Activities

S. P. Galphin (A.P.I. '40) has located for practice at Holly Hill, S. Car.

R. H. Cullop (O.S.U. '40) has established a practice at Pine Village, Ind.

J. T. Mitchell (A.P.I. '40) is now associated with G. J. Lawhorn (McK. '17) of Hartsville, S. Car.

Franklin F. Cline (Wash. '40) and John R. Tweed (Wash. '40) have established a small animal hospital at Walla Walla, Wash.

R. Allen Packer (Iowa '40) has accepted an assistantship in the Department of Veterinary Hygiene, Iowa State College, Ames, Iowa.

E. W. Krueger (Ont. '39), formerly located at Hustisford, Wis., has purchased the practice of the late R. E. Schuster in Evansville, Wis.

W. T. Dunn (Iowa '36), formerly associated with G. J. Lawhorn (McK. '17), Hartsville, S. Car., has located for practice at Greenville, S. Car.

L. P. Rutherford (Ont. '40) and J. E. Hendry (Ont. '40) recently announced the opening of the Halifax Veterinary Hospital, Halifax, Nova Scotia.

W. A. Browne (K.S.C. '28) has resigned from the San Francisco health department to accept a position with the Merced Dairy Breeding Association, Merced, Calif.

A. F. Nolan (Corn. '37) has resigned from the staff of the Department of Animal Pathology, University of Kentucky, Lexington, Ky., and is now located at Ithaca, N. Y.

C. D. Webster (Mich. '40) is now associated with O. F. West (Chi. '11) of Sheldon, Ill. Drs. West and Webster have just completed a modern small animal hospital and kennels.

Henry Kuzewski (Mich. '40) has accepted an instructorship in the physiology department of the School of Veterinary Medicine, A & M College of Texas, College Station, Texas.

T. W. Millen (Iowa '39), formerly research biochemist on the staff of Allied Laboratories, Inc., Sioux City, Iowa, is now associated with the Allahabad Agricultural Institute, Allahabad, U. P. India.

E. L. Taylor (K.S.C. '39) has resigned his position with the Gregory Laboratory, White Hall, Ill., to accept a post with the Department of Animal Pathology, University of Kentucky, Lexington, Ky.

K. F. Smith (O.S.U. '33) has resigned from the federal bureau of animal industry and is now associated with his brother, James L. (O.S.U. '31) in the operation of a small animal hospital in Beverly Hills, Calif.

C. E. Hofmann (K.S.C. '40) has been employed by the North Carolina state department of agriculture to do hog-sanitation work in the central part of the state. Dr. Hofmann will have headquarters at Nashville.

William C. Prouse (U.P. '07), for the past 20 years distributor for the Jensen-Salsbery Laboratories at Minneapolis, Minn., has purchased a small farm near Lewes, Del., and will practice in that vicinity.

Alfonso Rivera (U.S.C.V.S. '12), for the past 18 years associated with the department of health of Puerto Rico, has been transferred to the veterinary division of the department of agriculture and commerce, where he is serving as a veterinary inspector.

Clifford Westerfield (Mich. '38) has accepted a position in the College of Veterinary Medicine, The Ohio State University, Columbus, Ohio. Dr. Westerfield was formerly associated with the Department of Animal Pathology, University of Kentucky, Lexington, Ky.

The new small animal hospital of W. C. Sprinkle (Terre Haute '11) of Terre Haute, Ind., was damaged to the extent of several hundred dollars recently when an automobile hit it. It was necessary to completely rebuild the two outside walls of the operating room.

John J. Essex (Geo. Wash. '14), employed for the past twelve years as a fumigation officer at the New York Quarantine Station, has been assigned to temporary duty at Port au Prince, Haiti, for the purpose of observing the results of fumigation of airplanes bound for the United States.

DEATHS

Hobart C. Ayer of Decatur, Ala., died on May 5, 1940.

Dr. Ayer was graduated from the Ohio Veterinary College in 1892 and joined the AVMA in 1916.

Wm. F. Moore of Cincinnati, Ohio, died on May 15, 1940.

Dr. Moore was born at Canal Winchester, Ohio, on February 28, 1892, graduated from the Cincinnati Veterinary College in 1913 and joined the AVMA in 1918.

J. J. **Staab** of Montpelier, Vt., BAI inspector in charge of tuberculosis and Bang's disease control for the State of Vermont, died at the age of 46 on September 22, 1940.

Dr. Staab was born at Sigel, Ill., on November 24, 1892, and attended McKillip Veterinary College, from which he was graduated in 1914. He joined the national association in 1939.

Members of the Vermont Veterinary Medical Association attended the funeral in a body.

C. A. Hatterscheid of Glendive, Mont., died of a heart attack on September 16, 1940.

Dr. Hatterscheid was born at Corwith, Iowa, on January 8, 1877, and was graduated from the Chicago Veterinary College in 1903. At the time of his death he was employed as district deputy state veterinary surgeon at Glendive. He joined the AVMA in 1910.

John P. O'Leary of Brooklyn, N. Y., died on July 16, 1940.

Dr. O'Leary was born at Dublin, Ireland, on March 17, 1865, and was graduated from Harvard University in 1895. He joined the national association in 1896.

Wm. A. Heck of Knox, Ind., 72, died on September 19, 1940.

Dr. Heck, a member of the first Iowa State Board of Veterinary Medical Examiners, was graduated from Iowa State College in 1891. For a time he practiced at Maquoketa, Iowa, later moving to West Liberty, Iowa, where he practiced until 1920. Following, he moved to Texas, living there until 1933, when he moved to Knox, Ind.

Johannes Gutenberg (1400-1468)

The first week of October 1940 was Printing Week, celebrating the 500th anniversary of the invention of movable type by Johannes Gutenberg of Germany.

The first movable type were but small pieces of wood engraved at one end, but these led to the hundreds of type facings of the present craft and to the giant printing presses that grind out printed pages by the thousands per hour.

The world of today without Gutenberg's invention and its improvements has been the subject of many an essay, but no one has been able to conjure up the course a printingless world would have taken. Perhaps the vocal cords and the goose quill in lieu of printing would have made a better world than the one that sanctions the slaughter of its infants with incendiary bombs, U-boats and starvation.

That war kills the best things in the world was never exemplified better than when the fine governments of Scandinavia were invaded.

Owing to the small receipt of coal-tar products from Germany, importations of the products dropped in value from $1,062,000 for May 1939 to $472,700 for May 1940.

To raise the farm products used in the manufacture of motor vehicles requires 2½ million acres of arable land, but to feed the horses these vehicles replaced required over 40 million acres.

Dr. Henry D. Caldwell, president of the National Tuberculosis Association, predicts tuberculosis will be wiped out in the next two generations, that is to say, by the year 2000. The disease will surrender to chemical remedies and nutrition, President Caldwell declares.

At the dedication of Squibb's Institute of Medical Research, Dr. R. M. Wilder said in part: "Medical science in recent decades has developed principally in laboratories of animal physiology, and in consequence what we have learned about dogs and rats exceeds what we know about ourselves."

Chemical element 93 has been discovered by Edwin M. McMillan, University of California, and Phillip Hauge Aberson of Carnegie Institution. It was discovered by splitting uranium atoms. Its atomic weight is 239 as compared with uranium which weighs 238.5. It is said that by the same process element 94 will probably be discovered.

COMMITTEE REPORTS

Education

N. S. MAYO, Chairman

THE UNPRECEDENTED demand for a veterinary education is one of the important problems facing our profession today. In the past the demand increased and diminished in a series of waves, but at present it is increasing. A questionnaire sent to the deans of the veterinary colleges shows no diminution but, rather, a decided increase in the number of applications from prospective students. Veterinary colleges are limiting, and properly, the number of matriculants to their educational facilities. If this demand for veterinary education continues, it is probable that private schools may be established. A survey shows that there is no lack of qualified veterinary service to the livestock industry, except possibly on the western slope of the Rocky Mountains and the Pacific Coast.

During the past year two veterinary colleges, Alabama and Texas, have been visited by Dr. Hallman of this committee and requested assistance given. Last year attention was called to the fact that the veterinary division of Alabama Polytechnic Institute had two deans. This unusual situation has been corrected.

Professor Gomez of the University of the Philippines has requested that the veterinary college of the University be placed on the Association's accredited list. This committee is of the opinion that it is not practical or advisable to place any veterinary college outside of Canada and the United States on the accredited list, and so recommends. This is not to be considered as a reflection in any way on the standing of the veterinary college of the University of the Philippines, whose graduates are eligible to membership in this association.

A request has been received from a junior chapter of this association that the Committee recommend that veterinary graduates of a four-year course be entitled to wear a doctor's regalia. This subject has been carefully considered and this committee is of the opinion that the degrees to be granted and the regalia to be worn are matters that rest entirely with the authorities of the institutions where the veterinary colleges are located, and no recommendation is made by this committee.

In the college year 1939-40, there were in the accredited veterinary colleges of the United States and Canada approximately 2,983 students, an increase of 213 over last year. Of this number 575 graduated as compared with 395 the previous year. Of the total number of veterinary students 714 were in the pre-veterinary year. There are 27 women students working for a veterinary degree. An encouraging feature is that among the entrants there were 169 with two years of college credits, 40 with three years of college and 109 with college degrees. The Middlesex University veterinary college, not on the accredited list, reports 33 pre-veterinary students, 51 freshmen and 20 sophomores.

There were 164 deaths of veterinarians reported in the veterinary journals.

There has been a satisfactory increase in equipment, material, facilities and teaching force in most of the colleges. The veterinary school of the State College of Washington is greatly in need of additional space. Ontario Veterinary College inaugurated a five-year course and the School of Veterinary Medicine of the University of Pennsylvania a six-year course beginning this fall.

The Committee recommends that the

following colleges be placed upon the accredited list and their graduates be eligible for membership in this association:

1) Alabama Polytechnic Institute, Division of Veterinary Medicine;

2) Colorado State College, Division of Veterinary Medicine;

3) École de Médecine Vétérinaire de la Province de Québec, Université de Montréal;

4) Iowa State College, Division of Veterinary Medicine;

5) Kansas State College, Division of Veterinary Medicine;

6) Michigan State College, Division of Veterinary Medicine;

7) New York State Veterinary College, Cornell University;

8) The Ohio State University, College of Veterinary Medicine;

9) Ontario Veterinary College, University of Toronto;

10) University of Pennsylvania, School of Veterinary Medicine;

11) Texas Agricultural and Mechanical College, School of Veterinary Medicine;

12) State College of Washington, College of Veterinary Medicine.

Since all of the veterinary colleges are making improvements in buildings, equipment, and instruction staffs as rapidly as they are financially able, the Committee recommends that no classification of veterinary colleges be made this year.

Respectfully submitted,

(Signed) N. S. MAYO, *Chairman.*
E. T. HALLMAN,
C. D. MCGILVRAY,
W. A. HAGAN,
P. L. CADY.

Food Hygiene

M. O. ROBINSON, Chairman

DURING the year the special Committee on Food Hygiene has been engaged in work on several projects believed to be of importance to the veterinary profession. The following projects are in progress at the present time:

1) The formulation of a model ordinance for meat inspection.

2) An outline for the physical examination of dairy cattle. This in part is a continuation of the excellent work done by Klein and his committee some years ago.

3) Review of the literature for the purpose of recommending material which would be of value to veterinarians interested in problems pertaining to sanitary science and food hygiene.

These undertakings have required the collecting of material over a large field and our material has not accumulated in sufficient quantity for us to give a complete report at this time.

Respectfully submitted,

(Signed) M. O. ROBINSON, *Chairman.*
R. J. FOSTER,
A. G. HALL,
F. E. SMITH,
A. F. SCHALK,
J. S. JENISON,
M. B. STARNES.

Nomenclature of Disease and Vital Statistics of Domestic Animals

H. C. H. KERNKAMP, Chairman

The work of the special Committee on Nomenclature of Disease and Vital Statistics of Domestic Animals is going forward. The nature of the commission is such that but little more than a progress report can be presented at this time.

A meeting was held in Chicago on December 6, 1939, whereupon it was decided to divide and distribute the job of collecting and compiling the material pertinent to the scope of the Committee's obligation among its several members and also to invite and enlist the assistance of others showing a willingness to coöperate in bringing the assignment to a workable conclusion. This, it is believed, will help to get the job done in much shorter time and also to make it more complete and useful. The divisions or sections agreed upon and the persons responsible for each are as follows:

Bacterial diseases—I. A. Merchant, Ames, Ia.

Hypersensitizations—H. W. Schoening, Washington, D. C.

Locomotory complex—M. A. Emmerson, Philadelphia, Pa.

Neoplastic diseases—Wm. Feldman, Rochester, Minn.

Nutritional diseases—G. H. Hart, Davis, Calif.

Parasitic and protozoan diseases—B. J. Schwartz, Washington, D. C.

Poisonous plants—Frank Thorp, Jr., East Lansing, Mich.

Poultry diseases—F. R. Beaudette, New Brunswick, N. J.

Virus diseases—E. A. Watson, Hull, Quebec.

The Committee wishes to express its appreciation to the men who have consented to assist in this undertaking.

(Signed) H. C. H. KERNKAMP, *Chairman.*
F. R. BEAUDETTE,
M. A. EMMERSON,
G. H. HART,
I. A. MERCHANT,
H. W. SCHOENING,
E. A. WATSON.

Budget

CASSIUS WAY, Chairman

Income

	1940	1941
AVMA		
Dues	$17,000.00	$17,500.00
JOURNAL		
Dues	17,000.00	17,500.00
Advertising	10,500.00	14,000.00
Subscriptions	4,000.00	4,000.00
Total	$48,500.00	$53,000.00

Expense

AVMA		
Expense	$11,950.00	$12,565.00
Traveling	5,000.00	7,170.00
Furniture & Fixtures	300.00	400.00
	$17,250.00	$20,135.00
JOURNAL		
Magazine	$15,500.00	$15,000.00
Paper	2,300.00	3,500.00
Cuts	1,500.00	1,400.00
Expense	11,950.00	12,965.00
	$31,250.00	$32,865.00
Total	$48,500.00	$53,000.00

Respectfully submitted,
CASSIUS WAY, *Chairman.*
W. H. IVENS,
L. A. MERILLAT,
M. JACOB,
H. W. JAKEMAN.

Public Relations

MARK WELSH, Chairman

THE WORK of the veterinarian and that of the extension service is concerned primarily with the assistance and betterment of farmers. It is probably inevitable that certain points of difference would occur among those working in the same field. To effect a better understanding, meetings were held with the director of federal extension work, and the following is a letter prepared by Director M. L. Wilson for inclusion in this report:

The primary purpose of the extension service is to improve rural conditions through increasing the net income of those who operate the farms and ranches of the country. It is essentially an educational agency supported by federal, state and local funds.

In the best interests of farmers and stockmen we urge extension workers to encourage them to call more largely on veterinarians in the treatment of their live stock and thus aid in making it possible that expert veterinary service and guidance be available at all times. Of particular importance in this connection is the relationship which exists between the county agricultural agent in any county and the one or more practicing veterinarians resident in that county. Our observation is that that relationship is likely to be good in exactly the degree that the agent and the veterinarian really know each other. Any of us often distrust or dislike that which we do not know and do not understand. Under normal conditions nothing so contributes to harmony as good acquaintance.

While the most important place of contact between the veterinarian and the extension worker is in the county, there is much evidence to support the opinion that local relationships are most likely to be good when there is close coöperation and understanding within the staff at the state college and between that staff and veterinary organizations in the state.

Briefly stated, our national extension policy on this matter is that whenever the services of veterinarians are available, coöperative extension agents shall limit their activities in the animal-disease field, primarily to sanitation and preventive measures, and that they shall refer the farmer and stockman to the veterinarian in all cases involving the treatment of animals, either medically or surgically, the sale of viruses, vaccines and other biological products, and surgical instruments, and all similar matters in the veterinary field; also, that the closest kind of coöperation and coördination be encouraged between the county agents and veterinarians in watching over the health of the live stock in the county.

It is not a part of the county agent's job to treat sick live stock any more than it is to plow the farmer's corn or pick his cotton. When animals are sick it is generally better for the owner, the county agent and the veterinary profession that an efficient veterinarian be called if one is available within reasonable distance. There are circumstances, of course, particularly where veterinarians are scarce, under which the county agent almost of necessity engages in some work of veterinary character, but such occasions are rare. There is no more reason for the county agricultural agent to displace or be in conflict with the practicing veterinarian in his county than for the county home demonstration agent, who gives instruction in foods and nutrition, to be in conflict with the practicing physician.

We want all extension workers to enourage the faith of the farmer and stockman in the value of the qualified veterinarian in maintaining the health and general well-being of the live stock they own. We believe that even in districts where the services of veterinarians are unattainable except at great cost of time and money, county agents and other extension workers should not go beyond the teaching of farmers and stockmen that some animal diseases may be controlled or eradicated through the use of certain biological products and that efforts should be made to encourage veterinarians to take up practice in such regions and to support them when so located.

The extension service of the Department desires to do everything possible to promote harmonious relationships among all extension workers and veterinarians and believes that such relationships at the present time are the best in history and steadily improving.

The Committee on Public Relations is continually confronted with the problem of maintaining desirable publicity throughout the year on questions concerning the relationship of the veterinary profession to the public. During the past year there were numerous articles in local papers and many in those having national circulation. Articles were carried in magazines having national distribution, such as, *Time, Life, The American Magazine* and others. Two recent

motion pictures, "Florian" and "Maryland," have parts depicting the veterinarian most favorably. In one of these, Dr. Campbell, a member of this committee, furnished the producers with much of the background and technical information used. Radio addresses were given by several prominent members of the profession during the year and many other addresses were given before service clubs, organized farm groups and similar bodies.

Our country is so large and its veterinary problems so diversified that centralization of the work of this committee is becoming a fundamental necessity in the promotion of desirable public relations. It is felt that the public should be systematically informed on the many professional and technical projects in which they have a health, financial or human interest. It, therefore, seems advisable that all publicity work of the Association be delegated to the Committee on Public Relations and that the central office be charged with the responsibility of promptly distributing such information and data as should be released to the public.

The various branches of veterinary science (education, regulatory, research, commercial and others) are not as completely coördinated as would seem desirable and often those working in one branch tend to overlook the importance of others. In addition to its other duties it should be the objective of this committee to further develop the spirit of coöperation and effect better understanding of the purposes of the nation's entire veterinary service.

The Committee is glad to report that public relations have been greatly improved during the past year, mainly through the increased interest of state associations in the work of the national, and particularly through the greater acceptance of responsibility by members of the House of Representatives. Public opinion of veterinarians is largely shaped by the contacts with members of the profession whom they meet in public and private life. The success of the Committee on Public Relations depends much upon the selection of well-informed delegates to the House of Representatives and upon their being continuously informed throughout the year on questions of importance to the profession and the Association. It seems evident that we must establish two-way communication throughout the country if the best results are to be obtained. The leaders in particular in every state should be fully informed concerning veterinary problems of national interest, and they in turn must keep the central office informed on developments, news stories and similar material within the state, if we are to continually have the national picture within focus.

It would seem desirable that medical students and physicians be more fully informed as to the relationship of human and veterinary medicine. It is difficult to find desirable speakers and a mutually acceptable time for lectures on this subject before senior medical classes. It is suggested, therefore, that an informative but readable article be prepared for distribution to all senior medical classes with the hope that the wider coverage will compensate for the more desirable personal contacts. Many veterinarians are called on to discuss veterinary subjects before service clubs, farm groups and other organizations, and several have declined to appear because of lack of time or material to prepare the type of address wanted. Hence it is suggested that qualified members in coöperation with the central office prepare several suitable articles—such as "The Relationship of Animal Disease to Human Health" and "Purchase and Care of Pets" — that may be mimeographed and sent to members in need of them.

Agricultural subjects, including some veterinary science, are taught in an increasing number of high schools, and similar subject matter is given to "future farmers of America" and 4-H Clubs. This committee urgently recommends that veterinary practitioners coöperate with agricultural high school teachers in determining the scope and kind of veterinary information given to these youths.

The Committee feels indebted to one of its members, Kenneth G. McKay, for an excellent survey of the agricultural exten-

sion service last year and for his report this year on the condensed history of veterinary medicine in this country. These reports are intended to serve as the groundwork of our endeavors on informing the public of the many ramifications of veterinary science and the dependence of mankind on its intelligent application. The historical sketch which follows is in furtherance of this objective.

(Signed) MARK WELSH, *Chairman.*
D. M. CAMPBELL,
K. G. MCKAY,
L. A. MERILLAT,
C. F. SCHLOTTHAUER,
E. C. W. SCHUBEL.

Veterinary Medicine a Result of a Developing Agriculture*

IN LAST YEAR'S report a history of the metamorphosis of agricultural extension service in the United States was developed. This year's report shows the companion development of veterinary medicine in a complex American agriculture.

With an improved agriculture the need of veterinary training for protection of the livestock industry is exemplified in the establishment of the first private veterinary school in the United States in Philadelphia, in the year 1852. After undergoing three reorganizations, it was discontinued permanently in 1870.

Then followed the Boston Private veterinary Institute, organized in 1854 and discontinued in 1860.

The Veterinary Institute of Chicago was organized in 1864 and discontinued about 1869. The veterinary department of the University of Minnesota was organized in 1891 and operated for a time as a professional veterinary school, but graduated no students.

These earlier private schools with sessions limited to three months, with a maximum of six months, have been referred to as the "Dark Ages" of veterinary medicine in this country by the distinguished veterinary writers, Merillat and Campbell, in their book entitled "Veterinary Military History."

Formal veterinary education in foreign countries antedates that of America by 91 years. This is shown in the following table, giving places and dates of the establishment of foreign veterinary schools prior to the year 1852, when the first school was established in the United States.

Place	*Date*
Lyon	1761
Alfort	1765
Turin	1769
Padua	1774
Skara	1774
Dresden	1774
Parma	1776
Copenhagen	1777
Hanover	1777
Vienna	1777
Freiburg	1783
Carls Ruhe	1784
Jena	1816
Stockholm	1821
Utrecht	1821
Toulouse	1825
Lisbon	1833
Sanagone	1848
Charcow	1851
Budapest	1786
Berlin	1790
Munich	1790
London	1791
Milan	1791
Wurzburg	1791
Madrid	1793
Naples	1798
Bologne	1802
Berne	1808
Pisa	1815
Giesen	1828
Zurich	1820
Stuttgart	1821
Edinburgh (Dick)	1823
Brussels	1833
Warsaw	1840
Dorpat	1848

The U. S. Department of Agriculture was impressed early in its history with many and difficult problems connected with the animal industry of the country that needed solution, but in regard to which the most enlightened agriculturists and the most scientific men were profoundly ignorant. Most important among these problems were the diseases which often caused disastrous losses. The second commissioner of agri-

*Supplementary report of the Committee on Public Relations, prepared by K. G. McKay.

culture had occasion to call attention, in his second and third annual reports, to "the prevalence of fatal maladies among all varieties of farm animals resulting in the annual loss of not less than fifty million dollars," and recommended the establishment in the Department of a division of veterinary surgery.

In 1870, Commissioner Capron in an annual report said, "The value of stock lost annually from disease is enormous, and threatens not only to decimate our animals, but to expose the human family to disease from the consumption of unwholesome meats."

Veterinarians of that period were few and widely scattered. They were seldom consulted and were without authority to prevent the driving, the transportation or the sale of affected animals, resulting in the consequent unlimited spread of infection.

The total value of principal farm animals on January 1, 1884, was $2,467,868,924, while 55 years later it had almost doubled. The figure reported for January 1, 1939, was $4,853,875,000.

Our exported cattle and sheep had been refused admission into Great Britain and condemned to slaughter upon the docks where landed because of alleged contagious diseases in this country dangerous to foreign live stock. Our pork had been prohibited entrance into most of the countries of continental Europe because it was alleged to be infested with trichinae, and therefore dangerous to the health of the consumers. Twenty-five to thirty million dollars worth of hogs were dying each year from contagious disease. Cattle raisers were in condition bordering up a panic from fear of Texas fever and contagious pleuropneumonia, and state restrictions were seriously interfering with interstate traffic in bovine animals. Sheep raising had become precarious in many sections because of scab and other parasitic diseases. The repeated demands and agitation for governmental assistance culminated in 1884 in the establishment of the Bureau of Animal Industry.

THE PLEUROPNEUMONIA PROBLEM—OUR FIRST ANIMAL PLAGUE ON RECORD

The most pressing duty devolving upon the new bureau was to arrest the extension of pleuropneumonia and, if possible, eradicate that disease from the country. In attempting to perform this duty, it developed that notwithstanding the investigations and reports of scientific men, the commissioner of agriculture, under whom that work was to be entered upon, doubted the existence of the disease in the United States.

In five years from the time the work was initiated under veterinary supervision (eradication by slaughter of both diseased and exposed animals), the disease was officially declared to be eradicated at a cost of $1,500,000, a sum which was less than 5 per cent of the value of beef exported in 1892.

When we consider that the governments of Great Britain, France and Germany all undertook the work of eradicating pleuropneumonia long before the establishment of the Bureau of Animal Industry, and that none of them had yet succeeded in freeing its territory from the plague, we can appreciate the fact that the completion of our task in a comparatively short time was a notable achievement for veterinary medicine in the United States.

While United States veterinarians were "winning their spurs," colleges of agriculture were broadening their courses.

AGRICULTURAL TRAINING RECEIVES IMPETUS

In 1895, the agricultural association appointed a standing committee on methods of teaching agriculture, which had thus far presented four reports of progress. Taking up the work where the committee on entrance requirements left it, this committee first suggested that the following subjects be added to the general subjects to complete the four-year course in agriculture leading to the degree of Bachelor of Science: 1) agriculture; 2) horticulture and forestry; 3) veterinary science, including anatomy; 4) agricultural chemistry; 5) botany, including vegetable physiology; 6) geology; 7) meteorology; and 8) drawing.

Along with the improvement of the col-

lege courses in agriculture came the realization of the true function of these courses. It is now well understood that they were for the training of the leaders in agricultural progress and not for the general education of the agricultural masses. For this purpose they were made as thorough and complete internally as trained and intelligent leadership may require. Their success is to be judged by the same standard that is applied to other college courses, and the number of students was not of as much importance as their quality. For the general education of the agricultural people, young and old, agencies other than the four-year college course were to be employed, which would require for their management a large share of the graduates of the agricultural colleges.

The importance of the institutes as factors in the general education of farmers in some of the states where they were most successful may be indicated by the following brief statistics for the year 1898-1899.

In Wisconsin there were annually held 120 institutes, with an average attendance of over 50,000 persons. Sixty thousand copies of their annual institute bulletin, in which the best addresses were grouped together, making a book of over 300 pages, were annually distributed. A copy of this book was put into every school library in the state. For this work the state appropriated $12,000 each year. In Massachusetts 125 institutes were held, with an attendance of about 11,000 farmers. In West Virginia over 60 institutes were held, with a total attendance of 14,000. In Minnesota 50 farmers' institutes were held of two or three days each, with an attendance of from 200 to 1,000, and 25,000 copies of their annual report were distributed. In Indiana an attendance is reported of over 25,000, with an average of 272 persons in about 100 institutes. In Kansas 135 institutes were held, with a total attendance of 20,000. In Michigan institutes were held in nearly every county, and the total attendance is reported to reach 120,000. In Nebraska 60 institutes were held, with a total attendance of over 26,000. In Pennsylvania some 300 institutes were held, with a total attendance of over 50,000. In Ohio 250 institutes in 88 counties were held, with an aggregate attendance of about 90,000. In New York over 300 institutes were held in a single year. In California 82 institutes were held with approximately 16,000 in attendance.

BRIEF HISTORY OF TEXAS FEVER

In 1814, we find the first known accounts of a disease being disseminated by apparently healthy cattle from certain districts in the southern states when these cattle were driven north to market. Attention was at that time called to this phenomenon by Dr. James Mease in a lecture before the Philadelphia Society for Promoting Agriculture, who stated that the cattle from a certain district in South Carolina so certainly d i s e a s e d all others with which they mixed in their progress to the North that they were prohibited by the people of Virginia from passing through the state; that these cattle affected others while they themselves were in perfect health; and that cattle from Europe or the interior taken to the vicinity of the sea were attacked by a disease that generally proved fatal.

The cattle raisers of Texas were indignant at the charge brought against their herds, which they asserted were as healthy as any in the world, and not having a disease could not convey one.

By a diligent study of such facts, the border line of the infected district was traced from the Atlantic Coast in Virginia to the Pacific Coast in the vicinity of San Francisco, a distance, allowing for the departures from a direct course, of about 4,000 miles.

Today, science has made it possible to understand and explain the idiosyncrasies of this disease and to outline methods of control and eradication.

HOG CHOLERA

The high price of pork during and immediately after the Civil War stands out as a matter of historical importance to the veterinary profession in view of what the

coincidental flare-up in swine production has led to. Poultry excepted, no branch of animal production lends itself to such rapid expansion as that of swine. Because of the high price of lard and pork during and immediately following the Civil War, swine breeding began to be exploited to the limit. In 1859, hog cholera had broken out in Ohio. It spread like proverbial wildfire and by 1870 was already taking more than $10,000,000 annually from the pockets of the breeders—a staggering load for our animal industry of those days to bear. Forty years later, preventive hog-cholera vaccination was perfected and although it promised to put an end to the ever-increasing annual losses, the control of it fell into the hands of politico-agriculturists and thus it is failing to minimize the loss from the disease. The hope that reforms will be instituted lies in the field of more education and more regulation.

THE HORSE PLAGUE OF 1871

The ravaging epizoötic of 1871-72 was another incident that gave prominence to veterinary medicine. The disease was equine influenza complicated with virulent secondary infections manifested in the form of strangles and fatal pleuropneumonia, according to personal opinions expressed by Baker, McKillip, Paaren and others who came to Chicago in the wake of the catastrophe. Glanders of Civil War origin was a factor in this sweeping epizoötic in that it complicated the clinical picture and confused the self-made veterinarians who were on the scene.

THE ARMY'S FIRST VETERINARY ADVISER

C. M. Wood of Boston was employed by the Secretary of War as an inspector of animals for the Army of the Potomac in 1861. His employment was strictly in the capacity of a civilian. Wood was a remarkable man. He came to Boston from England in 1835 and began work as a blacksmith, but soon took up veterinary practice, which he carried on with outstanding success. He appears to have been the "brains" of the Boston Veterinary Institute and is known to have insisted upon educational qualifications for matriculation in that school. Wood seems to have been a man of high scholastic attainments, although it is stated he never attended any college.

EXPANSION OF VETERINARY COLLEGES

The rapid expansion of veterinary colleges in the United States began in 1857. (See table on next page for dates of establishment, dates of closing, year of first graduates, etc.)

GERM THEORY ESTABLISHED—1877

The great contest over the germ theory of disease between Bert and Pasteur was settled by the experiments reported in 1876 and 1877, and the way was open to apply this great discovery to practical medicine. What a revolution in medical thought and practice has resulted can be appreciated only by comparing the text of medical works of that day with that of the present day.

BIRTH OF U. S. BUREAU OF ANIMAL INDUSTRY MEAT INSPECTION

By the act of March 3, 1891, Congress directed the Secretary of Agriculture to inspect previous to their slaughter all cattle, sheep and swine, the carcasses of which were to be disposed of through the interstate or foreign trade, and authorized him in his discretion to make a postmortem inspection. This enormous undertaking was added to the many other duties of the Bureau.

The general meat inspection was designed to protect our domestic consumers from the meat of diseased animals and at the same time to enable the government to certify to the wholesomeness of exported meats. It was specially provided that no beef should be allowed to go abroad unless it had been inspected and was certified as free from disease.

The magnitude of this work was probably not appreciated by Congress at the time the legislation was enacted, although the desirability of such an inspection is incontestable. Owing to the great extent of our territory and the enormous number of

College	Established or Chartered	Closed	First Graduates	Number in First Class	Graduates 1866-1934 Inclusive
New York College of Veterinary Surgeons	1857	1899	1867	2	291
Ontario Veterinary College, University of Toronto	1862	....	1866	3	4,395*
Montreal Veterinary College; later Faculty of Comparative Medicine and Veterinary Science of McGill University	1866	1903	1869	3	268†
Cornell University	1868	1893	1871	1	4
American Veterinary College	1875	1899	1876	16	628
Columbia Veterinary College	1877	1884	1879	12	80
Iowa State College, Division of Veterinary Medicine	1879	....	1880	3	799
Northwestern Veterinary College	1881	1890	1885	1	3
Harvard University, School of Veterinary Medicine	1882	1901	1886	5	128
Chicago Veterinary College	1883	1920	1884	3	2,387
University of Pennsylvania, School of Veterinary Medicine	1884	....	1887	10	1,013
Ohio State University, College of Veterinary Medicine	1885	....	1887	1	1,060
Universite de Montreal, Ecole de Medecine Veterinaire	1886	....	1887	4	319
University of South Carolina, Division of Veterinary Medicine	1888	1891	1891	1	1
Baltimore Veterinary College	1889	1891	1891	1	1
Detroit College of Medicine, Veterinary Department	1890	1898	1892	4	35
Iowa Veterinary College	1890	1894	1892	2	13
Kansas City Veterinary College	1891	1918	1892	3	1,789
Kentucky State College, Department of Veterinary Medicine	1891	1895	1894	1	1
Ohio Veterinary College	1891	1896	1892	16	67
Indiana Veterinary College	1892	1924	1893	3	884
McKillip Veterinary College	1892	1920	1897	10	1,212
National Veterinary College; later Veterinary School of Columbian University	1892	1898	1893	6	62‡
New York State Veterinary College, Cornell University	1894	....	1897	3	863
United States College of Veterinary Surgeons	1894	1927	1895	2	419
Queen's University, Veterinary Department	1895	1899	1897	6	9
University of California, Veterinary Department	1895	1899	1897	3	10
Grand Rapids Veterinary College	1897	1918	1898	6	586
Western Veterinary College	1897	1908	1898	5	178
New York-American Veterinary College	1899	1922	1900	11	187§
San Francisco Veterinary College	1899	1918	1900	4	330
State College of Washington, College of Veterinary Medicine	1899	....	1902	2	260
Cincinnati Veterinary College	1900	1920	1903	3	410
University Veterinary College	1902	1906	1903	17	53
Kansas State College, Division of Veterinary Medicine	1905	....	1907	7	427
St. Joseph Veterinary College	1905	1923	1908	13	414
West Virginia University, Veterinary Department	1905	1912	1910	2	4
Alabama Polytechnic Institute, School of Veterinary Medicine	1907	....	1909	5	258
Colorado State College, Division of Veterinary Medicine	1907	....	1909	2	322
George Washington University, College of Veterinary Medicine	1908	1918	1911	25	100
Michigan State College, Division of Veterinary Science	1909	....	1913	1	175
Southwestern Veterinary College	1909	1916	1912	2	23
Terre Haute Veterinary College	1909	1918	1911	5	145
Arkansas Veterinary College	1913	1921	1916	2	25
Agricultural and Mechanical College of Texas, School of Veterinary Medicine	1916	....	1920	4	54
University of Georgia, State College of Agriculture and Mechanical Arts, Division of Veterinary Medicine	1918	1933	1921	3	70
					20,762

*1,032 of these degrees were conferred by the University of Toronto.
†141 of these from McGill University.
‡12 of these from Columbia University.
§71 of these from New York State Veterinary College.

This table was taken from. *Veterinary Military History of the United States.*

animals slaughtered, it was impossible to at once cover the whole country. It was necessary to instruct inspectors and to devise a system of administration with proper safeguards. Beginning at a comparatively few abattoirs, the service had gradually extended until in the first eight years it was established in 33 cities and covered the product of 128 abattoirs.

PERSONNEL, U. S. BUREAU OF ANIMAL INDUSTRY, 1939

At the end of the year 1939, there were on the Bureau's rolls 4,286 regular civil-service employés in the various grades, divided as shown in table I.

TABLE I—Civil-service employés of the Bureau in the various grades, fiscal year 1939.

	No. Employes in		Total No. Employes
	Departmental Service (in Washington, D. C.)	Field Service	
Professional and scientific	65	1,979	2,044
Subprofessional	18	1,633	1,651
Clerical, administrative and fiscal	163	371	534
Custodial	15	42	57
Total	261	4,025	4,286

Of the 20,044 employés in the professional and scientific service, about 92 per cent were veterinarians.

CONFUSION EXISTED IN THE A.E.F. VETERINARY SERVICE

Over 60,000 animals were procured by the A.E.F. before a veterinary hospital was established. The American troops went into the field in the Marne with over 50,000 animals without providing a veterinary service to hospitalize the disabled. This was more than a year after the first troops arrived in France.

The incidence of contagious disease among the American animals in France was found to be running dangerously high. The safety of the other armies and the agricultural industry of France was threatened.

While the A.E.F. was still in training, its animals were already in a pitiful plight. It was understandable why the regulations drawn up by the general staff on the handling of the remount and veterinary services were pronounced "insufficient" by the French government.

There was danger of our troops being hooted off the theater of operations, badly as they were needed, but the crises on the Western Front prevented vigorous allied action.

The general staff refused to organize a veterinary service such as the armies around them were maintaining, even when the government of France insisted that such a service was essential to the welfare of the civil population as well as to the armies operating in the field.

General Pershing knew little of the operations of the veterinary service under his command until October 1918, when the failing animal transport was blocking progress in the Argonne. Col. Quekemery, one of his aides, on investigating the situation, found that the Veterinary Corps had been neglected and on reporting that it "had done well under difficult conditions," took steps to bring about the necessary reforms.

AGRICULTURAL EDUCATIONAL SURVEY

In 1926, the writer had occasion to make a study of the demand on public service agriculturists for livestock disease information.

The Smith-Hughes agricultural teachers of Iowa, Kansas and Nebraska were chosen because the topography and climatology of the three states are nearly identical. Iowa and Kansas also have accredited veterinary colleges while Nebraska does not. This offered an opportunity for comparison, since

all other agricultural factors were quite similar.

Thirty-two Smith-Hughes teachers of Nebraska replied as follows: 12 per cent reported they referred all inquiries relative to diagnosing and treating diseases to veterinarians; 82 per cent reported they endeavored to comply with requests to diagnose and treat animal diseases.

Fifty-three Smith-Hughes teachers of Kansas replied as follows: 26 per cent refer all inquiries relative to animal diseases to veterinarians; 74 per cent reported they attempted to comply with requests; 50 per cent deplored their lack of training in veterinary science.

Seventy-two Smith-Hughes teachers of Iowa replied as follows: 25 per cent refer all inquiries to veterinarians; 75 per cent reported they were called upon to treat diseases enumerated; 39 per cent deplored their lack of training in veterinary science.

Forty-eight state supervisors for agricultural education under the Smith-Hughes law reported to a questionnaire as follows: 21 per cent reported teachers had enough training in veterinary science; 79 per cent reported teachers needed more training in veterinary science. Many of these supervisors even thought that practical work in treating slight injuries and administering first aid would be beneficial.

Iowa State Agricultural Graduates.—Replies were received from 97 or 48 per cent of the total number selected. Thirteen per cent reported their objection to more training in veterinary science; 87 per cent reported county agents and Smith-Hughes teachers needed more training in veterinary science.

Veterinary Deans.—Eleven deans of the accredited veterinary colleges of the United States evidenced an almost uniform viewpoint, feeling that county agents and Smith-Hughes teachers received sufficient training. They also agreed that agricultural students know very little about the common ailments and diseases of live stock. Some deans replying indicated that if more training were to be added, it should be hygiene, preventive medicine and sanitary science.

NEW ERA IN VETERINARY EDUCATION

For the purpose of making some comparisons on veterinary student enrollment for the past ten years, with pre-veterinary students left out of consideration, let us look at the figures in table II.

TABLE II—Enrollment of regular veterinary students for years 1929-30 to 1938-1939.

COLLEGE YEAR	STUDENTS
1929–1930	1053
1930–1931	1212
1931–1932	1378
1932–1933	1401
1933–1934	1370
1934–1935	1568
1935–1936	1810
1936–1937	1927
1937–1938	2170
1938–1939	2339

These represent the enrollment of regular students (freshmen, sophomores, juniors and seniors) for the past ten years. There has been an increase every year but one (1933-34) and the total enrollment has more than doubled during the ten-year period. It has more than trebled since 1927-28 and has almost quadrupled since 1924-25. This year there are more freshman students enrolled than there were students in all classes any year during the period 1923-27.

At no time in the past has veterinary education in the United States received the attention that is being given to it at present.

Enrollment has become such a serious problem in some veterinary colleges as to cause concern among the deans on account of lack of state appropriations, personnel and physical equipment. There are ten accredited veterinary colleges in the United States, the number being unchanged from last year. The number of foreign recognized veterinary colleges, 14, remains unchanged.

The past year there were approximately 2,770 students entering the veterinary colleges of the United States and Canada, in-

cluding 590 pre-veterinary students. This is an increase of 196 over the previous year.

GOVERNMENT PRINTING PRESS

"The government of the United States is the greatest of all modern publishers: It employs thousands of scientists who are engaged the year around in making researches and investigations in all branches of agriculture and household economy, in geology, in mining, in electricity, in chemistry, in astronomy, in engineering, in aviation, in preventive medicine, in forestry, in irrigation, in shipping and railroad problems, in trade and manufacture. The arts of war as well as those of peace are also actively cultivated. The greatest art of all, that of maintaining and spreading free government, is strongly carried on by President, Cabinet, Senators, Representatives, Army and Navy."

The foregoing, quoted from a government bulletin, indicates something of the nature and extent of the available literature, some of which relates to veterinary science, that is available to agricultural workers. Moreover, these professional articles have been written by men of the highest repute in their respective fields.

CONCLUSIONS

It is apparent in the study of the companion development of veterinary medicine and agricultural extension service that the latter shows a history of service to American agriculture of more than a century and a half.

It had its beginning in the organization of the Philadelphia Agricultural Society in 1785, some 67 years prior to the first attempt at teaching veterinary medicine in the United States. The Philadelphia Agricultural Society was formed to acquaint its members with what was being done to improve agriculture.

Today we observe agricultural extension service subsidized in 3,000 counties in the United States with a personnel of 8,680 workers devoting nearly 16 per cent of their time in livestock programs consisting of animal husbandry, dairy husbandry and poultry husbandry.

On the other hand, we observe veterinary medicine in a companion way subsidized by the federal government. All states, some counties and many cities can now boast of a technically trained veterinary corps in their organizations.

The phenomenal changes in the Veterinary Corps of the United States Army is no less miraculous. From its first appointee, a blacksmith, it has grown to be an organization wherein only graduates of the highest scholastic attainments may hope to receive appointments.

Records reveal the formal education of veterinary medicine in the United States changing from a three-month private school course to a six-month one; from a year course to a two-year course; from a three-year course to requirements of high-school graduation before entering the four-year course. We further note the passing of the private veterinary schools and colleges into the state institutions subsidized by public funds and open only to a selective group of candidates for the five- and six-year veterinary courses. The colleges of veterinary medicine, ten in number, well regulated by government and state supervision, augur well for the future of veterinary medicine in America.

It is possible that the vast number of publications by the government printing press on agricultural material has assisted in widening the breach between veterinarians and those in subsidized agricultural positions, because they are available to the public and are used by veterinarians, county agents, Smith-Hughes teachers, breeders and farmers.

SUGGESTIONS

1) While it seems inadvisable to teach diagnosis of animal diseases to agriculture students, they should be trained in recognition of animal ailments, to know when to call for professional service.

2) Veterinary instruction given to agriculture students may properly include: sanitation; first aid; disease prevention, as

far as it may be safely practiced by laymen; information relating to animal diseases, leading only to that differentation which will enable the farmer to know when the services of a veterinarian should be invoked; and treatment of animal ailments comparable in nature with that practiced by the human family.

3) A veterinarian should be appointed to the Washington office of the agricultural extension service.

4) A veterinarian should be appointed on every state agricultural extension service staff.

5) Veterinarians with agricultural training should be appointed as county agents in counties with a large livestock population.

6) Veterinarians should be appointed as county livestock inspectors in the more densely livestock-populated counties.

7) Honorary membership in the state veterinary medical association should be awarded to state directors of agricultural extension and deans of the colleges of agriculture.

Respectfully submitted,
KENNETH G. MCKAY

Subcommittee on Veterinary Items National Formulary Committee

H. D. BERGMAN, Chairman

THE SUBCOMMITTEE on Veterinary Items of the National Formulary Committee has no detailed report to make at this time. The formal revision of the National Formulary will extend over a six-year period, 1940-46, and the committee work is still somewhat in the organizational or formative stage. While it is true that a completely revised new edition of the N. F. appears only each decade, it is also true that revision work goes on continuously during the ten-year period. During the four years since the publication of N. F. VI, the National Formulary Committee has been very active and revision has progressed rapidly along many lines.

In August 1939, at its meeting in Atlanta, Ga., the council of the American Pharmaceutical Association elected a new National Formulary Committee which is a highly specialized one, each of the ten members serving as chairman of a subcommittee and the whole ten serving as the N. F. Executive Committee. Under the new plan of organization the chairman of the committee is a full-time man on salary and will be located in Washington. In connection with the new N. F. committee there has also been a reorganization of the special committees and subcommittees. The title of the committee representing the interests of veterinary medicine has been changed from "Associate Committee on Veterinary Preparations," as it appeared in N. F. VI, to "Subcommittee on Veterinary Items" because of the fact that a number of items to be referred to this committee are not strictly preparations but, rather, are single drugs. For example, information has recently been sought from the subcommittee pertaining to the varieties of aloes and their uses and dosage in veterinary medicine. The subcommittee has also been advised that questions will be presented to it on a number of singles and preparations appearing in N. F. VI, especially as regards dosage in veterinary practice.

It will be recalled that in the preparation of N. F. VI, veterinary medicine for the first time was formally invited to coöperate and was represented by a special committee in the development of one of our two American official drug publications. The relations of the committee with the Revision Committee were most cordial. All suggestions were given careful attention and several inclusions peculiar to veterinary medicine were made in N. F. VI and standards established. Experience to date indicates that the same cordial relations will continue in connection with the current N. F. revision, to the mutual advantage of all concerned.

Respectfully submitted,
(Signed) H. D. BERGMAN, *Chairman.*
R. F. BOURNE,
P. W. BURNS,
C. F. CAIRY.

Tuberculosis

L. M. HURT, Chairman

THE WHOLE PERIOD covering eradication of tuberculosis in the United States is within the memory and experience of a great many of our livestock sanitary officials and veterinary practitioners.

Your committee believes that sufficient history has been made to justify the presentation of a brief résumé commemorating real tuberculosis control among domestic species and the approach toward practical eradication of the bovine type from the beef and dairy herds of the United States. Such a history had been prepared, but as it comprised 22 typewritten pages, it was thought to be entirely too long for a committee report; however, we believe that the material already collected could be enlarged upon or turned over to some other committee to present as a supplementary report or simply as a paper on the history of tuberculosis eradication. The Committee feels that it is more important to consider the present status of bovine tuberculosis eradication, to properly evaluate what has been accomplished, and to know and understand the problems that still confront us lest we have some serious setbacks.

Reports of the Bureau of Animal Industry for the year 1938 stated that there were 47 modified accredited states in the United States, leaving but one in which considerable work remained to be done.

PRESENT STATUS OF ERADICATION CAMPAIGN

At the end of June 1940, the dairy and breeding cattle in the United States had been tuberculin tested one or more times. In this immense project there are approximately 62 million cattle under coöperative supervision. All but two counties, located in the State of California, out of 3,071 counties in the United States and all the provinces of Puerto Rico and the Virgin Islands are now modified accredited areas. To attain this status required the application of approximately 230 million tuberculin tests, which resulted in the slaughter of approximately 3,772,000 tuberculous animals determined by those tests. This has been achieved at a cost to the various states and the federal government of approximately $273,095,843.42, which is prorated herein as follows:

Federal indemnity	$ 58,693,943.09
Federal operating expense	30,821,874.39
State indemnity	128,649,802.92
Operating expense—state, county and municipality	54,930,223.02

During the fiscal year 1939-40, there were approximately 12 million cattle tested throughout the country, and approximately 0.5 per cent, or 60,000, reacting animals were revealed as a result of these tests.

Only one other country, Canada, has displayed the courage to attack a tuberculosis problem presented by the bovine type of infection with the same energetic determination shown by this country, and no country in the world where the disease has occurred as a serious problem has yet attained the success achieved in the United States in control and eradication. Our position in this field of endeavor has already won the respect and admiration of most civilized countries in the world.

Since tuberculosis among cattle in the United States is now at a low ebb, all cattle must be regarded as highly susceptible to the disease and further protection to the industry in this respect depends entirely upon state and federal appropriations sufficient to maintain adequate control until the disease has been completely eradicated.

Some of the subjects we are presenting here may no longer be problems in certain sections of the country; however, in other sections one or more may be most important phases for consideration. Among these are no visible lesions, false or nonspecific reactions and comparative tuberculosis.

NO VISIBLE LESIONS

Since the inauguration of the tuberculosis-eradication project in 1917 and up

to June 30, 1939, there were 217,491,705 official tuberculin tests applied, and of this number, .22 per cent were classified as no visible lesion cases. From July 1, 1939, to May 1, 1940, 10,222,099 tests were administered, which, on the same basis, resulted in .21 per cent no visible lesions. The proportion of no visible lesion cases, based upon the total number of animals tested, has remained somewhat constant throughout the program. However, as the work progresses and we approach the point of complete eradication, it will be readily understood that the percentage of no visible lesion cases, based upon the total number of reactors involved, will naturally increase as the ratio of macroscopic cases in this group is reduced. It also should be indicated that in areas where tuberculosis still exists, the percentage of no visible reactors may be greater than in the average given, because in such areas the veterinarians will no doubt be apt to mark many animals as reactors which in other areas would not be so considered. Those of us who have had experience with the subcutaneous tuberculin test before the official introduction of the intradermal test know, and the records will show, that the former yielded no visible lesions in probably as large a proportion as we are obtaining from the intradermal test. In the early days, however, it was not as important a factor as it has become at this time.

NONSPECIFIC (FALSE) REACTIONS

There are no doubt many who believe that there is no such thing as a nonspecific tuberculin reaction, and they argue that lesions of tuberculosis are always present in reactors, but can not be located. All must agree that a large proportion of the cases of no visible reactors in a tuberculous environment may belong to this group and that it is impractical, and perhaps impossible, to go over a carcass carefully enough to be able to state that definite tuberculous lesions were not present. Nevertheless, there is an appreciable percentage of no visible lesion cases where it is firmly believed that the reaction to tuberculin was brought about not by the presence of tuberculosis but by some other factor. Some believe that the reactions in such animals are not typical. Perhaps this is true, but atypical reactions, where tuberculosis is present in an animal, have not been rare, and a high percentage of reactions in the so-called no lesion cases are typical and can not be differentiated in any way from the typical reaction that is due to the presence of tuberculosis. In general, we must, therefore, conclude that reactions to tuberculin, indistinguishable from those which developed in cases of definite mammalian tuberculosis, have been observed in animals whose history and autopsy indicated that they were nontuberculous. This question is too large to discuss in detail in a report of this nature, but it must be looked upon as an important problem which should receive proper recognition and continued study.

Among the accepted and proved causes for these reactions is the presence of detected and nondetected acid-fast skin lesions. Just as genuine tuberculosis can be present without being detected by ordinary or even by careful inspection, there are no doubt acid-fast bacterial skin lesions which may be missed because of size or location. Not infrequently those who have studied this question have found lesions of from 2 to 5 mm. in diameter, containing large numbers of acid-fast bacteria, which if inoculated into guinea pigs failed to produce tuberculosis. Such lesions, or even smaller ones, could readily have caused a reaction and could easily have been missed in a careful examination.

Sensitization, with or without the production of localized lesions by the human or avian type of tubercle bacilli, has been proved and accepted; however, when the latter is suspected, a supplementary or a simultaneous test with avian tuberculin will in most cases solve the problem. Animals so sensitized will respond with comparatively large reactions to avian tuberculin, while the reaction with mammalian tuberculin would be very small or negative.

There are, however, exceptions to this rule also.

Evidence has also been accumulated, slowly but definitely, that acid-fast bacteria of various kinds other than those mentioned can induce such sensitization to tuberculin. Reactions due to sensitization caused by this group of acid-fast microörganisms and to the avian type of tubercle bacilli are more or less transient. This is also the case to some extent of the tuberculin sensitization caused by acid-fast bacterial skin lesions.

We are of the opinion that special tuberculins are worthy of consideration and we would recommend further study in an endeavor to prepare a tuberculin that will differentiate sensitization due to tuberculosis from that due to some factor that is not recognized as being associated with tuberculosis.

The Committee also desires to call attention to the fact that since we see our goal in sight, it may become advisable to let down the bars of certain restrictions. This, however, should not be done indiscriminately. It is necessary that certain procedures be continued, at least for some years. One of these is the retesting of cattle in spite of the fact that the areas in which they are maintained have been reported as free from tuberculosis for some time, and the states and counties which have contributed personnel and funds to the work should be encouraged to continue. This applies especially in sections of the country where the incidence of the disease in the beginning of this campaign was rather high and where in many instances the application of annual or semiannual tests should be continued until there is no longer a possibility that infection may be lurking upon the premises. Attention has already been called to this precaution, and some states are making arrangements and appropriations to take care of such work. It is considered by some that more attention should be paid to methods of cattle transportation, since the use of the truck for this purpose has come extensively into vogue. This method of transportation is not controlled as satisfactorily nor has it been studied as carefully as railroad transportation. It is suggested that utmost care be used. It is as necessary now as at any time because we still have some tuberculosis in certain areas of the country, and it would be unfortunate if as a result of a little laxity in supervision the disease were reintroduced into areas that have been free for some time. The situation with regard to trucks could be vastly improved.

Trucks used to transport diseased animals to slaughtering centers and to local railroad yards for shipment are frequently not cleaned, particularly in cold weather, and such trucks used thereafter for moving healthy live stock represent a definite menace. Thorough cleaning after each hauling job would be the ideal arrangement, but if this can not be attained attention should be directed to trucks used for transporting known-diseased animals. Observation, history and reports appear to indicate that the development of tuberculosis in some animals was due to truck exposure. We have in mind especially those trucks engaged in collecting and distributing animals to and from community sales.

Considerable ground must be gained in bringing these sales under proper official or other competent veterinary supervision. Cattle offered for sale through such yards for purposes other than immediate slaughter should be accompanied by certificates carrying adequate identification and stating their freedom from tuberculosis under tests administered within 30 days by state or federally approved veterinarians.

There is still opportunity for buyers and shippers of cattle to obscure the origin of animals intended for interstate movement. Dairy and breeding cattle should come from lots or herds free from tuberculosis, and should be so completely identified that the origin may be readily determined when reactors are detected among them under tests administered at points of destination. The statement of origin is too often confined to tag numbers and names and addresses of owners. In many instances a salesyard tag is all that is mentioned on the certificate accompanying shipments. Careful super-

vision of interstate transactions in the state of origin should eliminate much of the trouble that develops at destination. Detailed instructions to veterinarians authorized to prepare certificates covering such shipments are generally well received. Owners should be impressed with the necessity of presenting—in addition to the results of test or the statement of origin in a modified accredited area—sufficient data, including the numbers of well-sealed eartags, to enable official veterinarians at points of destination to readily identify every animal in the shipments.

COMPARATIVE TUBERCULOSIS

While efforts directed against bovine tuberculosis have resulted in remarkable progress in its eradication so that this disease is becoming a rarity in many places, tuberculosis is still a problem among hogs and chickens, and occurs less often in other species. While these rarer forms of comparative tuberculosis present a problem in each respective species, the possible relationship to the procedure of eradication of bovine tuberculosis is very important.

Tuberculosis occurs infrequently in goats, but may assume a very malignant type in this species. It is even less frequently noted in sheep, and according to the literature most of the cases that have been typed are avian. This is probably because sheep are more likely to be maintained in contact with poultry, or come from areas in which avian tuberculosis has been prevalent. It is known, however, that goats and sheep contract bovine tuberculosis. It has been proved that goats are at least as susceptible, by experimental inoculation, to the bovine type as are cattle—a fact that must be kept in mind in connection with the work of bovine tuberculosis eradication.

Pigeons and parrots suffer from tuberculosis and must be regarded as possible centers of infection. Dogs occasionally contract tuberculosis and although not many cases have been typed, several have been of the bovine type. Some of these may be reservoirs of infection to plague its total eradication.

Rats and mice are generally considered resistant to tuberculosis; however, they can be infected artificially with both mammalian and avian types. The lesions do not go on to caseation and clinical symptoms. Tubercle bacilli multiply in all the organs and while they may not produce gross lesions, infected animals may disseminate the organisms. Rats and mice frequent feed receptacles and may contaminate the feed as well as disseminate tuberculosis mechanically.

These rarer forms are usually atypical, difficult to diagnose, and present a challenge to all those interested in tuberculosis and its eradication. While these may not be important factors in the tuberculosis problem, their possible existence should be recognized.

AVIAN TUBERCULOSIS

Control and eradication of avian tuberculosis constitute the next important step in connection with this disease. Many infected flocks do not show evidence of tuberculosis because the feathers obscure and hide the paleness and changes of emaciation associated with the disease.

Its control is doubly important because of its communicability to hogs and an occasional sensitization to the point of reaction in cattle. Annual condemnation of swine for tuberculosis continues almost constant as compared with the rapid diminution in the number of cattle condemned under inspection. This, coupled with the fact that we now find quite a large proportion of cases in swine to be due to the avian type of the tuberculosis organism, seems to prove the economic importance of this form of the disease. While the loss to the swine industry is heavy on account of condemnation of large numbers of heads and occasionally whole carcasses, the loss to the poultry industry from lowered vitality, decreased egg production, emaciation and mortality is much higher. There is still much work to be done in the eradication of avian tuberculosis which merits the well-directed attention, efforts and support of all who are connected with or in any way interested in

livestock disease-control work.

We have, however, good reason to feel that the federal-state bovine tuberculosis-control campaign is advanced sufficiently towards completion to justify celebration in any way, at any time, and to any extent that may please those connected with this great piece of work.

Respectfully submitted,

(Signed) L. M. HURT, *Chairman.*
J. TRAUM,
W. J. BUTLER,
E. T. HALLMAN,
E. L. STUBBS,
E. T. FAULDER,
H. M. O'REAR.

Proprietary Pharmaceuticals

D. W. ASHCRAFT, Chairman

AS USUAL, the work of the Committee on Proprietary Pharmaceuticals has been handicapped by lack of money and the great distances separating the members of the group. The bulk of the work, therefore, has been handled through correspondence. During the year, however, Chairman Ashcraft and the secretary held two conferences, and at another meeting the chairman conferred with H. E. Moskey, a member of the Committee, in Washington.

The Committee's principal effort was to formulate a program pertaining to the veterinary pharmaceutical situation which in the end would result to the best interests of the livestock industry and the veterinary profession. Inasmuch as any program offered by this committee must represent the majority opinion of the Association, the following basic program is submitted to the House of Representatives for approval or disapproval.

1) To publish in the JOURNAL the findings of the court on veterinary products as issued by the Food and Drug Administration in its monthly press releases and notices of judgment, as well as reports of the Federal Trade Commission, post office requirements, and any other information dealing with drugs which may be of interest to veterinarians.

2) That this committee should coöperate with the Food and Drug Administration in the enforcement of the Food, Drug, and Cosmetic Act, with the Federal Trade Commission in connection with the enforcement of the Wheeler-Lea Act, dealing with the advertising of foods and drugs, and with the post office department in connection with the enforcement of the law prohibiting fraudulent use of the mails.

3) To make known the scientifically established facts relating to the controversial issues on drugs for the benefit of the veterinary profession. In this connection, timely articles written by members of the Committee would be published in the JOURNAL upon approval of the entire committee, in an effort to edify the profession, just as the Council on Pharmacy and Chemistry of the American Medical Association presents facts regarding controversial subjects for the guidance of the medical profession.

4) To pass on all advertising submitted to the JOURNAL in an effort to prevent the advertising of claims which are not backed by scientifically established facts.

The Committee is cognizant of the fact that part 2 of this proposal will evoke considerable discussion, and hence our reason for bringing this matter to the attention of the House at this time in order to obtain the opinion of the Association as a whole.

Other activities of the Committee during the year included contacts with the Food and Drug Administration, the Bureau of Investigation and the Council on Pharmacy and Chemistry of the American Medical Association, Agricultural Publishers Association and numerous firms who have sought advice regarding veterinary pharmaceutical products.

Respectfully submitted,

(Signed) D. W. ASHCRAFT, *Chairman.*
EUGENE B. INGMAND, *Sec'y.*
R. S. AMADON,
R. F. BOURNE,
H. J. MILKS,
H. E. MOSKEY.

Bang's Disease*

R. R. BIRCH, Chairman

YOUR COMMITTEE is gratified to report continued progress in the control of Bang's disease and in steps looking toward its ultimate eradication. Important phases of this progress are recorded in data obtained from the U. S. bureau of animal industry—the best statistical source available. Significant are the following data:

Cattle under supervision	12,300,000
Herds under supervision	1,600,000
Percentage Under Supervision	
In the United States	21
In 10 states	more than 50
In 11 states	26 to 50
In 12 states	10 to 25
In 15 states	less than 10
Approved herds, federal	55,000
Cattle in approved herds	1,100,000
Cattle on waiting list for initial testing	1,000,000

Important as these data are in themselves, they do not complete the picture. Many herds are being cleaned or have been cleaned by private testing or in state programs; the testing has shown areas and herds that may be freed from the disease at small cost; and confidence in our testing program is steadily increasing. There are now 298 counties in 20 states classified as "modified accredited."

INTERSTATE REGULATION

The fundamental considerations regarding all interherd transfers of cattle (intrastate or interstate) are found in the status of the herd of origin, the status of the herd of destination and the status of the transferred individuals. Given due regard for these factors in all circumstances, interstate regulations would be superfluous, for essentially the infected herd is the dangerous unit; the clean supervised herd is the safest one, irrespective of state lines. The tendency in some states to neglect testing and the practice of shipping infected cattle to distant states where the complaints are less pointed constitute the chief justifications for state regulations of any kind.

Your committee believes that under present conditions interstate regulations serve a useful purpose; it believes that they should be built around the status of the herd of origin including that of the transferred individuals. It believes that with minor exceptions uniformity is procurable and highly desirable as it relates to the antigen used, the technic employed and the manner of interpretation. It does not believe that a state compelled to import large numbers of cattle can always have as effective regulations as the one that is not compelled to import, and it does not believe that effectiveness in either case should be surrendered merely in the interest of uniformity.

Your committee knows that much unnecessary irritation, misunderstanding and legitimate opposition to state regulations can be removed by frank acceptance by all

*This report is subscribed to and signed by all members of the special Committee on Bang's Disease except W. Wisnicky. Outside of the following provision, the report also bears his approval: "Your committee further recommends that steps be taken by the various states to provide recognition for certified, negative vaccinated herds whenever there are those that can qualify, and it suggests the following essentials for such a plan:"—etc., a) to f). [See page 505.]

Dr. Wisnicky's stated reasons for not subscribing to the above-mentioned provisions are:

"1) The wording is so general that it leaves open the opportunity for placing interpretations which would be detrimental to the cause of Bang's eradication.

"2) The quoted essentials for such a plan are incomplete; provisions relating to the use of the vaccine which are only in concurrence with what is already being practiced are mentioned, but there is a complete failure to mention the actual essentials for a certification plan as such.

"3) No mention is made to clarify the point as to whether the vaccinated, certified herd would be recognized on a special basis, or whether vaccinated herds would receive recognition under the existing certification plan by complying with its provisions."

Dr. Wisnicky adds: "For the purpose of clarifying my view on this aspect of the report, I wish to state that I have no objection to indicating that vaccinated herds can qualify for certification when they are freed from the disease with the aid of vaccine. To give recognition to vaccinated herds on a special basis would, in my opinion, open the way for a wave of vaccination practice that would be detrimental to the cause of Bang's eradication. Already some advertising for sale of vaccinated cattle is causing considerable misunderstanding. It would likewise move the situation into a direction where vaccination would come in more definitely as a substitute, rather than as an aid to the eradication program."

states of the abundantly demonstrated fact that the blood of some noninfected cattle frequently agglutinates temporarily in low dilutions—which signifies that only scant significance need be attached to these low agglutinations provided the animals come from officially supervised herds that have been regularly tested and have shown no definite reactors during the year immediately preceding the date of shipment. Your committee strongly recommends that under these circumstances low agglutinations (we suggest partial at 1:50 as a maximum) shall not disqualify for interstate shipment. This policy, we believe, would place the regulations on a sound, scientific basis and remove unnecessary confusion, annoyance and legitimate grounds for objection on the part of cattle breeders.

This committee believes that the test of the individual as a basis for the interstate shipment of females of breeding age is not entirely adequate. It provides only partial protection, and because exposed animals not yet reacting are traded, it builds up an ill-founded sense of security among purchasers who naturally assume that cattle fit to enter a state are fit to enter their clean herds. When this assumption proves ill-founded, breeders lose all confidence in the test.

OFFICIALLY SUPERVISED HERDS

Federal- and state-supervised herds and those kept clean by well-guided testing and supervision are the basis of all progress in the eradication of Bang's disease. These herds provide distributed, informed and influential support for the testing program and a safe and expanding source from which replacements for clean herds may be obtained. Your committee, therefore, recommends steady support for these supervised herds through every possible channel, as all progress depends on their increase and is measured by it. Experience proves that these herds can not be maintained as clean units if cattle from outside herds are added to them on the basis of the test of the individual. This is in line with experience regarding the test of the individual as a basis for interstate shipments.

VACCINATION

Your committee presents these facts regarding vaccination against Bang's disease:

1) Smooth, fresh cultures of strain 19, first reported by the U. S. bureau of animal industry, have shown substantial evidence of being the safest and most effective immunizing agent yet employed extensively against Bang's disease.

2) It is known that vaccine from strain 19, especially when used on calves, provides in most cases a substantial resistance.

3) It is known that vaccination of calves with strain 19 produces a few permanent reactors and that it fails in some instances to prevent infection when cows vaccinated as calves are exposed to natural infection with virulent field strains.

4) There are not sufficient, controlled data regarding the duration of the immunity produced by strain 19.

5) In calves strain 19 produces a sharp agglutinin response lasting usually about six months.

6) Strain 19 is much less virulent for guinea pigs than are the ordinary field strains.

7) Other Brucella strains undergo modifications in their pathogenicity and antigenic qualities, and we must reckon with the possibility that strain 19 will not be an exception in this regard.

8) Calves vaccinated with strain 19, if they subsequently cease to react, are no more likely to be carriers or spreaders of Brucella strains than are nonreacting cattle that have not been vaccinated.

Having in mind the points just enumerated, your committee recommends that inasmuch as strain 19 is known to be capable of producing blood reactions in cattle, immediate and vigorous steps be taken by the federal government and the several states to prevent its use by laymen and to permit the use of vaccine only under official auspices with the requirement for tagging and reporting of all vaccinated animals.

In no other way can we prevent its fraudulent use to create reactors eligible for indemnities, and its indiscriminate use in mature cattle and clean herds. And if under our present laws there is no recourse but to license biological houses that sell live Brucella vaccine to laymen, then we recommend that our committee on legislation be instructed to seek modifications that will correct the deficiency.

Your committee further recommends that steps be taken by the various states to provide recognition for certified, negative vaccinated herds whenever there are those that can qualify, and it suggests the following essentials for such a plan:

a) Vaccination confined in these herds and for the present to calves 4 to 8 months old, as recommended by the U. S. bureau of animal industry.

b) A confirmatory test one to two months following vaccination.

c) Official identification and recording, with dates, of all calves that are vaccinated.

d) Source of the vaccine to be reported and recorded.

e) For the present, segregation of calves before vaccination and their return to the herd only after they have become negative to the agglutination test. (Not regarded as necessary unless the objective is a certified, clean, vaccinated herd.)

f) The usual periodic recorded testing in the mature herd.

When this plan is followed by a breeder, your committee recommends that animals vaccinated during calfhood shall be eligible for federal and state indemnities provided there is on record one negative test not less than 30 days after vaccination; and when such herd will certify, as other herds now certify, it is recommended that they be accorded the same preferences relative to interstate shipment that apply to clean, unvaccinated herds.

Your committee further recommends to livestock sanitary officials and veterinary practitioners a policy that will provide for an initial blood test and careful survey of a herd before any vaccination is done; a policy that will involve the trial of vaccination as an adjunct to a test and elimination plan, rather than as a substitute for it; a policy that recognizes that vaccination has not yet proved itself immediately useful in emergencies created by the introduction of Bang's disease into a mature herd; and a policy that makes the known facts regarding vaccination, favorable and unfavorable, clear to the breeder so that he may make an intelligent choice. Much yet remains to be learned; hence, your committee has restricted itself to defining the conditions under which vaccination has the best chance to succeed, in the hope that future efforts may be guided along these channels.

INDEMNITIES

The federal government and many individual states have embarked on a policy that depends for its effectiveness on the payment of indemnities for infected cattle. Your committee here points out the danger of half-hearted or hit-or-miss support of this policy. If hard-won gains are not to be lost, if the testing program is to accomplish its purpose, or even if we are to know whether or not it is capable of accomplishing its purpose, it must have generous and sustained financial support. Your committee recommends such support.

RESEARCH

The partial mastery we now have of Bang's disease has been made possible only by long-continued and careful researches. These researches have paid for themselves many times over. The investigators of the U. S. bureau of animal industry and those in the many state and endowed institutions continue to carry on this work enthusiastically and effectively. On the basis of their records and their potentialities they are deserving, in the public interest, of continued and increased public support.

Respectfully submitted,

(Signed) R. R. BIRCH, *Chairman.*
C. P. BISHOP,
C. R. DONHAM,
HUGH S. CAMERON,
R. A. HENDERSHOTT,
A. EICHHORN.

Veterinary Biological Products

H. MARSH, Chairman

THE COMMITTEE on Veterinary Biological Products met once during the year, at Chicago, on December 7, 1939. Those present were E. B. Ingmand, Frank Breed, F. A. Imler, H. W. Peirce and H. Marsh.

As no report was made in 1939, and as no biological products have been classified since 1937, it seems desirable to briefly review the work of this committee during its 15 years of existence. It is the duty of the Committee to classify veterinary biological products as acceptable or not acceptable to the Association. Between 1927 and 1937, the following 17 products have been classified as acceptable:

Anti-blackleg serum
Anti-anthrax serum
Anthrax vaccine
Antivenin
Autogenous bacterin
Blackleg natural aggressin
Blackleg cultural aggressin
Blackleg bacterin
Botulinus antitoxin
Anti-hog-cholera serum
Mallein
Normal serum (bovine origin)
Normal serum (equine origin)
Rabies vaccine
Tetanus antitoxin
Tuberculin
Avian tuberculin (intradermic)

No biological product has as yet been classified as not acceptable.

At the time the present Committee started its work, the virus-serum control division of the U. S. bureau of animal industry and the producers of veterinary biological products were in the process of standardizing formulae, nomenclature and labeling of all veterinary biological products. The Committee decided, therefore, that it would not attempt to classify any products as to acceptability until the biological industry had adjusted its business to the new conditions. Most of these changes have now been accomplished, and it is the purpose of the Committee to vigorously attack the problem of classification as to acceptability.

It is the opinion of the Committee that the recent changes will work out to the benefit of both the producers and users of veterinary biological products. Under the new licenses, the number of products has been reduced, and the names used by the various producers for similar products must be the same. The producers also have agreed on certain standard formulae for nonspecific products, and these products may not be recommended as specific for any disease. The labels on the containers of these products must be limited to the name of the product, the formula used in its preparation, and directions for its use. This change puts the responsibility of selecting an appropriate product on the veterinarian, which is where it belongs.

The Committee realizes that it is imperative to bring the work of classification up to date as soon as possible, so that proper attention can be given to new products as they may appear. Therefore, it recommends to the Association that the following be added to the list of acceptable products:

Brucella abortus vaccine
Canine distemper vaccine (tissue origin)
Encephalomyelitis vaccine (chick-embryo origin)
Hog-cholera virus
Ovine ecthyma vaccine
Anti-swine-erysipelas serum
Tetanus toxoid

It is the understanding of the Committee that the purpose of classification of veterinary biological products is primarily to assist the practicing veterinarian in making the most effective use of available products, giving him confidence that any product on the acceptable list is of proved value. The Committee has a secondary responsibility to attempt to protect the livestock industry against the exploitation of nonspecific biological products of no value by

veterinarians or producers. This can not be accomplished entirely by listing as acceptable or not acceptable, as products which may be eligible for acceptability, if used properly, may be sold in large amounts to livestock owners for use in conditions for which they have no value.

In this connection the Committee desires to express an opinion in regard to the group of nonspecific products. It is our opinion that the availability of these products promotes unscientific practice, and that their production should be discouraged.

The Committee is not yet ready to definitely classify any products in addition to the list given above, but, pending further study and final decision as to classification, it is felt that the above expression of general opinion in regard to so-called nonspecific products comes within the scope of the duties of the Committee on Veterinary Biological Products.

It has come to the attention of the Committee that in some instances veterinary biological products which are of proved value, and which are included in the list of products accepted by this association, have been used with unsatisfactory results, not because of any deficiency in the product, but because of improper use or faulty administration. The Committee, therefore, desires to remind the members of the veterinary profession of their responsibility not only in the selection and proper administration of veterinary biological products, but in acquainting every owner with the potential danger, if such danger exists, which may follow the use of such products.

The Committee recommends the adoption, by the Association, of the provision in the proposed revision of the constitution and by-laws which relates to the selection of the personnel of the Committee on Veterinary Biological Products.

(Signed) H. MARSH, *Chairman.*
EUGENE B. INGMAND, *Sec'y.*
FRANK BREED,
I. M. CASHELL,
F. A. IMLER,
H. W. PEIRCE.

Parasitology

D. W. BAKER, Chairman

THE SPECIAL Committee on Parasitology recommends that a permanent committee on parasitic diseases be established. This committee should consist of six or seven members with terms extending for two or more years and so rotated that not more than two are replaced or reappointed each year.

This committee should initiate a survey of the animal parasitisms occurring in North America. One or two men who have a particular interest in parasitic diseases should be designated as reporters from each state and province.

A list should be published by the Committee of the parasites of domestic animals found in North America, giving the correct scientific name according to the International Rules of Zoölogical Nomenclature, the common name, location and host. This information would be particularly useful to those who publish information in the field of parasitology.

D. W. BAKER, *Chairman.*
GERARD DIKMANS,
C. R. SCHROEDER,
E. A. BENBROOK,
M. W. EMMEL,
H. L. VAN VOLKENBERG,
L. STEVENSON.

Representative to the American Association for the Advancement of Science

WARD GILTNER

THE ANNUAL winter meeting of the American Association for the Advancement of Science was held between Christmas, 1939, and the New Year, in Columbus, Ohio. The section on medical sciences (section N, with which we are affiliated) arranged a symposium on "Blood, Heart and Circulation." At the first session, papers were presented on the prothrombin and thrombin content of heart tissue and the relation of the former to vitamin K. Factors influencing the

size and shape of the red blood cells, radioactive iron studies relating to the formation and destruction of hemoglobin and to the circulating red blood-cell volume, and the rôle of diphosphoglycerate and other organic acid-soluble phosphorus compounds of the red blood cells in intermediate phosphorus metabolism were subjects discussed. Dr. Sabin (who received the Theobold Smith award in medicine) announced a new theory regarding the formation of antibodies by the reticulo-endothelial system. He also presented his findings on constitutional barriers to involvement of the nervous system by certain viruses. The physiology of coronary blood flow was the subject of the next two sessions. The two following sessions were devoted to cardiac failure and hypertension. The final session dealt with the heart and circulation in special territories, including a paper on traumatic lesions of the heart resulting from purposeful or accidental causes. The papers will be published by the Association.

One paper, by J. W. Gowen of Iowa State College, reported on the use of x-rays to check up the size of virus particles of mosaic plant disease. The size of the virus molecules, or of that portion necessary for reproduction, was gauged by the wavelength of the x-rays necessary to render them inactive. It worked out as a molecular weight of approximately 15 million. In a paper by E. L. Spencer of The Rockefeller Institute for Medical Research, it is stated that viruses thrive particularly well on a high-nitrogen diet. V. L. Frampton of Cornell University told of the discovery that the tobacco virus is liquid as water when stirred or shaken, but "set" like a firm jelly when permitted to stand undisturbed. Such substances are technically known as "thixotropic soils."

Dr. Albert Francis Blakeslee, director of the Carnegie Institution Station for Experimental Evolution at Cold Spring Harbor, Long Island, was elected president of the Association.

Your representative has attended to all the official business that has arisen during the year in so far as the relations between the AAAS and the AVMA are concerned.

Respectfully submitted,

(Signed) WARD GILTNER.

Representative to the Horse and Mule Association of America

T. A. Sigler

THE PURPOSE of the Horse and Mule Association of America is to aid and encourage the breeding, raising and use of horses and mules, all breeds and types—work, racing, riding and pleasure horses included.

The efforts of this organization have been concentrated in three fields: first, the farm, where all horses and mules are produced and where most of them are used; second, the nonagricultural field, which is the consumer of horses and mules and farm products; and, third, the pleasure horse field, which also furnishes a profitable outlet for farm-raised horses and farm crops.

Despite the fact that motive power has made great inroads on horse power, the horse is still holding its own in popularity among all other farm animals, and especially so is the pleasure and riding horse.

One thing that helped to bring about the trend toward motive power was the fear of the loss of horses through sleeping sickness. Farmers all over the Midwest, where the disease had been epizoötic, were panic-stricken. They did not know what to do and many of them sold their horses or traded them in on tractors. It was evident to all that the first and most important job of the Association was to get the information about sleeping sickness and its control to as many people as possible.

The first thing they did was to publish a little booklet, No. 234, which contained Dr. Schoening's address at our last meeting and the informative discussion which followed. They started to distribute it and then decided they needed a shorter leaflet, just giving the substance of the address and discussion, so they got out a single-page leaflet, No. 237.

They distributed that material through-

out the winter and spring to all the stallion owners whose names they could obtain, to veterinarians, to key men of every county, the county agents and teachers of vocational agriculture, and sent letters and material on control methods out to them as quickly as possible.

These booklets were sent to about 8,000 country banks for distribution. The Standard Oil Company of Indiana was interested enough to order and pay for 25,000 copies, which they distributed to farmers through their local representatives. They took the position that it was a part of their job to help stamp out this disease.

The country was practically "plastered" with this information, where the disease had been or where it threatened to be. Comparatively few horses were lost.

The Association also got out a leaflet, "Your Son and His Bride," which is the result of questions and answers and interviews with more than 300 of the best horsemen and farmers of this country. They were asked, "If your son were starting out with his bride and going into farming, which would you want him to use, horses or tractors? If you would prefer him to use horses, what reasons would you give to prevail on him to use horses, rather than tractors?" Their answers were put into a concise booklet. This, along with other material, was sent to every teacher of vocational agriculture, thereby putting the information directly into the hands of 72,480 students in vocational agriculture.

Every one of us must drive home to farmers that the sound, economical procedure in the long run is to use horses and mules, and to raise their own. They must breed their mares to good sires. There is a good supply of stallions in the country, but not enough good jacks to keep up the mule supply.

It is useless to tell a farmer or a farm boy not to use a tractor, when he either has one already or has made up his mind to get one. Just tell him to go ahead and get the tractor, but to keep a couple of pairs of good mares working on his farm as an anchor—to use them when possible and use the tractor only in a rush season or the hot season; to keep the teams in good shape by using them and keep them up in good flesh. By-and-by, when that man runs out of money to pay for gas and oil, he will have good young work animals.

Every farm needs a good team to be used in repairing fences when the ground is soft and to haul out manure at a time when the tractor would mire down.

Not only does the farm still need horses, but the Army still needs them. The article which appeared in the *American Legion Magazine*, on the part played by horses in the World War, was written by our AVMA secretary, Dr. Merillat. Further publicity was given the article by Congressman Gillie. This article should convince the most skeptical that we still need horses for the Army.

Again this spring Indiana staged stallion shows in different parts of the state. These shows have been staged for several years. Each year the event attracts a great number of out-of-state people interested in Indiana's Percherons and Belgians.

Each fall, after the state fair is over, a round-up is held. For several years this has been held at the Gregg farm near Indianapolis, but this year it will be held on the state fair grounds, due to the increasing attendance each year. They are counting on 1,000 horses this year, including saddle horses, pleasure horses, cow ponies, etc. This event attracts more people than any other comparable event held in the state.

Several other affairs of a like nature are staged by individuals in central Indiana each year, and attract increasing numbers of spectators. I merely mention these facts because I feel they may give others the idea of using similar methods in advancing interest in horses.

The Chicagoland One Hundred Mile Ride was held in October 1939, sponsored by the Town and Country Equestrian Association and the Horse and Mule Association of America. The principal purpose of this ride is to stimulate interest in horseback riding, to give a better understanding of the essentials in good riding horses, how to

condition them, and to encourage greater use of the hundreds of miles of safe riding trails in Chicagoland. The ride is especially intended to create interest in the breeding and use of good riding horses possessed of conformation, feet and legs, quality, courage and stamina to make good mounts for trail use.

The Horse and Mule Association has done much throughout the country to promote interest in the pleasure horse and riding trails, and the pleasure horse's popularity is increasing by leaps and bounds. It still holds the spotlight in all of our small-town celebrations. Many little crossroads towns are holding horse shows this year that have not held shows for years. Some really high-class saddle shows have been witnessed by your reporter this year.

Pulling contests are put on at most of these small fairs as a drawing card; also, at picnics and other gatherings these contests are staged.

The national horse association is doing all in its power to bring about added interest in all branches of horse breeding and is constantly on the lookout for propaganda detrimental to the industry. They are spending thousands of dollars for the benefit of the horse and horse owners. It is a wide-awake body backed by all organizations that have to do with the horse and horse use. We, the veterinarians, need their support, and the Horse and Mule Association of America appreciates the coöperation given by the AVMA and solicits our future aid.

Respectfully submitted,

(Signed) T. A. SIGLER.

Poultry Diseases

CLIFF D. CARPENTER, Chairman

TWO MEETINGS of the special Committee on Poultry Diseases were held, the first in Chicago, Ill., December 7, 1939, and the second in Washington, D. C., August 26, 1940. At the first meeting we concerned ourselves with discussions as to general plans for the year's work, and how the Committee's work could best benefit the members of the AVMA. At the Washington meeting the year's work was surveyed and summarized, and resulted in offering recommendations which will appear later in this report.

At the Chicago meeting it was brought to the Committee's attention that the interests of the membership might be served better if all poultry activities were grouped under one committee; that practitioners seldom have served as committee members; that poultry subject matter has received scant attention in programs given before the general sessions; and that poultry, a billion-dollar industry, has been grouped on the clinic program with sheep and hogs, resulting in but little attention being given to poultry diseases.

POULTRY MEDICATION

It was pointed out that the three principal prescriptions of general practitioners for the control of poultry diseases include "intestinal antiseptics," drugs for attempted treatment of coccidiosis, and the use of mixed bacterins; yet, successful poultrymen have found little, if any, value in their use. This conflict between successful poultrymen and general practitioners serves to delay further the day when greater responsibility for the control of the staggering losses from poultry diseases will be vested in the veterinary profession.

NEW DISEASES

Pullet disease, also called "blue comb disease," "contagious indigestion," and many other names, is reported by Jungherr and Levine of the University of Connecticut. It involves an average of 25 per cent

of the affected pullet flock early in the laying period, and results in an average mortality of 5 per cent. This disease, while not new, appears in the literature this year for the first time. It is particularly prevalent during the months of September to December inclusive, in the New England and other northeastern states. In the field the disease may be confused with fowl cholera, but no infection was found by the Connecticut investigators. The clinical picture is sudden onset, droopiness, cyanosis, anorexia and, in acute cases, pyrexia. Chief gross lesions are a mucoid enteritis, soft or broken ovarian follicles, chalky pancreas, and small, yellowish areas in the liver. The kidneys show an uric nephritis. From the findings of these investigators, so-called pullet disease would appear to represent an uremia, the cause of which is under investigation.

The incidence of paratyphoid infection, particularly in turkey poults, is reported to be increasing in various parts of the country. While no new diagnostic or control methods have been discovered during the past year, the Committee wishes to emphasize the importance of early detection of the infection and to reiterate that sanitation, both in the hatchery and on the farm, elimination of carriers, and good husbandry, constitute the chief means of keeping losses at a low level. No highly specific agglutination test has been found as a means of further control.

Hogan and Patrick of the Missouri Experiment Station report the discovery of a nutritional factor, other than manganese, as being responsible, at least in part, for perosis. They report that this factor is found in the vitamin B complex, and tentatively named it vitamin Bp. While this work has not been confirmed by other investigators, it is believed by many that a manganese deficiency is not the only factor causing this disease.

POULTRY-DISEASE NOMENCLATURE

Two years ago this committee was authorized to revise the nomenclature of poultry diseases and present same at the 1939 meeting of the Association. The 1938-1939 committee, by generous coöperation of the Northeastern Conference of Laboratory Workers in Pullorum Disease, submitted a check list of the virus diseases of birds as the first step in completing this compilation.

Through continued coöperation, the committee this year presents the second section of this work, a check list of the bacterial diseases of birds. (See page 515.)

SURVEY OF POULTRY PRACTICE IN THE MIDWEST

The principal activity of this committee was a survey of poultry practice in Illinois, Indiana and Ohio. This survey took the form of a questionnaire and included 19 questions. It was sent to 750 veterinarians —250 in each of the above-mentioned states. A diligent attempt was made to see that it was sent to general practitioners only. The number of questionnaires returned is as follows:

Illinois	50, or 20.0%	of those mailed
Indiana	74, or 29.6%	of those mailed
Ohio	87, or 34.8%	of those mailed
Total	211, or 28.1%	of those mailed

Since about one half of the total number of general practitioners registered in the three states were sent questionnaires, the Committee considers this a sizeable sample, and presumes that a critical study may be made from these returns.

Sixteen per cent of the veterinarians reporting indicated that they have no poultry practice; 22 per cent derive less than 10 per cent of their income from poultry practice; 48 per cent indicated that poultry produces about 10 per cent of their total income. Ten per cent of those reporting indicated that poultry practice provides about 25 per cent of their total income and three veterinarians out of the 211 reported a 50 per cent poultry practice.

An analysis of the poultry population in the counties of the three states covered by this questionnaire indicates that many general practitioners reporting very little or no poultry practice reside in areas richly populated with poultry. In contrasting manner, some veterinarians in general practice receive a good percentage of their in-

come from a poultry practice and do not have a higher than average poultry population. These analyses suggest that there is little relation between opportunity for poultry practice and its fulfilment.

LAYMEN ACTIVE IN POULTRY PRACTICE

Eighty-one per cent reported that in their areas, laymen conduct pullorum testing; 66 per cent said that laymen vaccinate chickens and turkeys for the prevention of fowl pox; and 82 per cent replied that laymen worm poultry flocks. Nearly half said that these laymen make a charge for their services.

In one of the three states covered, 32 per cent of the veterinarians sell fowl-pox vaccine to their clients, presumably for their own use. The average for the three states was 20 per cent. Fifty-three per cent sell worm-control products to the laity, and 11 per cent sell pullorum antigen.

The remaining 14 questions had to do with special veterinary conferences and short courses designed to aid the practitioner in problems of poultry practice.

In one state, 70 per cent had attended such a conference sometime during the past three years. This figure was twice that of the other two states, leaving the average in the three states at a 44 per cent level. Fifty-six per cent, then, had not attended a veterinary conference where poultry practice was featured, since 1937 or before. Eighty-one of the 89 who attended said they had received distinct helps which they since had applied to their practices.

The key question of this survey follows: "If extension classes in poultry diseases for veterinarians only, were provided by your state college or university, would you make application for enrollment?" In two states 79 per cent of those returning the questionnaire said "yes." The third state replied 73 per cent in the affirmative, or 77 per cent for the three states. Most wanted evening meetings or afternoon and evening combined, preferring that they be held at m o n t h l y or semi-monthly intervals. More than 80 per cent said they would attend all scheduled classes and desired eight to twelve such classes.

Over half preferred that classes be held during the months of January, February and March; 29 per cent during July, August and September; and 15 per cent said October to December, inclusive, were preferable months.

Since it would not be feasible to hold extension classes in each county, the veterinarians were asked how many miles one way they would be willing to drive to attend these classes. The answers averaged about 50 miles one way. Ten to 20 per cent of those answering this question indicated they would drive from 75 to 100 miles one way for each class. On the presumption that extension classes for a given subject are not offered unless demanded, the committee asked these practitioners the following question: "When you have been notified of the returns from this questionnaire, and, provided a sizeable demand for these classes is indicated, will you write your state college, asking for this type of instruction?" Eighty-seven per cent of the 155 who indicated they wanted extension classes answered in the affirmative.

The Committee invited criticisms of poultry conferences which these veterinarians had attended, and further asked that they offer suggestions in the event extension classes were made available. As might be expected, many had no criticisms of special conferences they had attended, nor did they suggest particular means of guiding the extension classes. Three out of every four, however, replied with comments, criticisms and suggestions all the way from praising the powers that made these conferences possible in the past to villifying them with language unworthy and unacceptable to become a part of this report.

Twenty-seven per cent made no comment; one out of every four indicated that the conferences they had attended had been satisfactory or that the proposed plan of extension classes was agreeable to them. Thirty-five veterinarians from the three states demanded more demonstrations, autopsies, and more practical men to give instruction. They suggested less emphasis on experimental work and theories. Only a quartet asked for more laboratory work.

Five per cent indicated that they were entirely satisfied with their own general practice without including poultry, saying that they had no time for it, or that it was not profitable. Twenty-six veterinarians mentioned, as their greatest objection to poultry practice, that there was too much conflict with lay practice—many wanted legal protection, or hatcheries licensed. Seven per cent specifically asked for more time, more emphasis and more literature on poultry subject matter for the practitioner. The remaining 4 per cent indicated that veterinarians themselves were to blame for not having a greater poultry practice.

Following is the form in which the questionnaire was handled:

AMERICAN VETERINARY MEDICAL ASSOCIATION

SPECIAL COMMITTEE ON POULTRY DISEASES
CLIFF D. CARPENTER, *Chairman*
717 Davis Street, Fort Wayne, Ind.

Dear Doctor:

The special Committee on Poultry Diseases is making a study of poultry-disease control in the United States. You and 749 other general practitioners in Illinois, Indiana and Ohio are being asked the questions included in this questionnaire, as one means of determining the desire of practicing veterinarians to do a greater amount of poultry practice.

It is important to us, and we trust it will prove beneficial to you, to have answers supplied to the questions asked. At the earliest possible opportunity, won't you please fill in the answers and be free with your comments, suggestions and recommendations? Thanks a lot.

Sincerely,
Cliff D. Carpenter.

1. What percentage of your practice is derived from poultry?
   None.... 25%..... More than 50%.....
   10%..... 50%.....
2. How many commercial hatcheries are there in your practice area?.....
3. In your community do laymen . . . Conduct pullorum testing?.....Vaccinate against fowl pox?..... Worm poultry?.....
   (This is not intended to include a farmer doing his own work.)
4. Do such laymen charge a fee, or are they service men on the payrolls of hatcheries or feed stores?.....
5. Do you sell fowl-pox vaccine, worm products and pullorum antigen to clients who do their own work?.....
6. Have you attended a special veterinary conference on poultry diseases in your state during the past three years?.....
7. Under whose auspices was the conference held? .....
8. Was attendance limited to veterinarians? .....
9. About how many veterinarians were in attendance? .....
10. Did you receive therefrom practical helps which you were able to employ in your daily poultry practice?.....
11. What were your criticisms of this conference—in other words, how might it have been improved? .....
    .....
    .....
12. In the state of Michigan, regular extension schools for veterinarians only, have been conducted to refresh practitioners in poultry management and disease control. If extension classes in poultry diseases for veterinarians only, were provided by your state college or university, would you make application for enrollment?
    Yes..... No.....
    (For Illinois practitioners this would be an elaboration of the work fostered by the University of Illinois during 1939.)
13. Would you prefer these classes to be held In the afternoon?..... Evening?.....
    Or both?.....
14. Would you plan to attend regularly if classes were held
    Weekly?..... Twice a month?.....
    Monthly?.....
15. Please state how many such classes you would attend. .....
16. If extension classes were made available covering an eight- to twelve-week period of time, indicate which season of the year would be most desirable.
    January to March inclusive.....
    July to September inclusive.....
    April to June inclusive.....
    October to December inclusive.....
17. Since classes could not be held in each county, how many miles, one way, would you be willing to drive, to attend extension classes? .....
18. When you have been notified of the returns from this questionnaire, and provided a sizeable demand for these classes is indicated, would you write your state college asking for this type of instruction?.....
19. Please state briefly any suggestions you have which might be of help to this committee in planning such extension classes.
    Your comment .....
    .....
    .....
    Signature—Dr.....
    Mail Address.....

RECOMMENDATIONS

The poultry committee offers the following recommendations for your consideration and approval:

1) That the name of this committee be changed from "Special Committee on Poultry Diseases" to "Poultry Committee."

2) That all poultry interests and activities of the AVMA, including the poultry section and poultry clinic, be correlated under the direction of the poultry committee.

3) That the number of committee members be set at seven, including two practitioners.

4) That the chairman and secretary of the poultry section automatically become members of the poultry committee.

5) That at least one poultry paper each year be presented before one of the general sessions of the Association.

6) That the list of bacterial diseases of birds be published as a part of this report and that a limited number of reprints be made for sale to libraries and individuals. It is also recommended that this committee continue to add to the check list of bird diseases.

7) That additional research in the following diseases be given early and earnest consideration:

a) A study of control measures for coryza; investigation of stock bacterins, autogenous bacterins and pure cultures of attenuated strains of *Hemophilus gallinarum*.

b) Investigations of the pathogenicity of trichomonads in turkeys.

c) Investigations of the mode of infection and control of hexamitiasis.

d) Research to determine the status of single drugs and combinations of drugs in the control of poultry diseases, particularly coccidiosis and other intestinal infections.

e) Investigations to determine whether or not vaccination against fowl cholera and fowl typhoid in both chickens and turkeys is of significant value.

f) A critical study of the prevalence, pathogenicity and control measures for mycosis.

8) That the Bureau of Animal Industry and the federal coördinators in the National Poultry Improvement Plan be urged to lower the tolerance of reactors in the U. S. Pullorum-Tested Class, from the present 10 per cent, as a maximum, to 8 per cent for 1941, 7 per cent for 1942, 6 per cent for 1943, and a maximum of 5 per cent beginning with 1944.

9) That, since pullorum control and eradication represent an important phase of the National Poultry Improvement Plan, a graduate veterinarian, well qualified in poultry, be added to the staff of coördinators at the earliest opportunity.

As stated earlier in this report, this committee believes that a representative cross section of general practitioners was reached in the survey questionnaire. Proceeding on this presumption, it may be stated, then, that the average general practitioner is not functioning adequately as the fountain head for disease information for the poultry industry.

While deploring this condition, we do not believe it necessary to review here all the reasons for this present lack of veterinary participation. In our opinion, however, the most important are lack of interest on the part of the veterinarian, failure to keep abreast of new poultry-disease findings, and not giving poultry diseases proper attention on veterinary programs, or failing to attend veterinary meetings where poultry diseases have been featured.

That corrective measures can no longer be delayed, if the veterinary profession is to accept its full responsibility to the farmer, is the firm belief of this committee, and we present, therefore, the following additional recommendations:

10) That veterinary colleges and veterinary departments, in each of the 48 states, assisted by state and district veterinary associations, conduct a detailed survey to determine the amount of poultry practice being done by each licensed veterinarian; the number of veterinarians who would enroll in regularly scheduled extension classes for veterinarians only, if conducted by their state college or university; and any other information germane to the issues involved.

11) That, when these figures are available, adequate arrangements be made by state institutions to offer extension instruc-

tion in poultry-disease control to graduate veterinarians only.

12) That such instruction include anatomy, physiology, gross and microscopic pathology, parasitology, therapeutics, and particularly nutrition, sanitation, management and breeding.

13) That all state and district veterinary programs feature poultry papers, demonstrations and clinics of practical value.

14) That this committee continue to investigate further ways and means of bringing an improved veterinary service to the second most valuable animal population in this country.

Respectfully submitted,

(Signed) CLIFF D. CARPENTER, *Chairman.*
C. A. BRANDLY,
W. E. BRANDNER,
C. J. BRYER,
A. J. DURANT,
T. P. POLK,
C. E. SAWYER.*

*Deceased.

Bacterial Diseases

1. Staphylococcus infectious Staphylococcosis Staphylomycosis Osteoarthritis Infeccoes estaphylococcicas (Port.) Staphylokokkenkrankheit (Gr.)	a. aureus	Goose (1, 2, 4) Duck (2, 5) Chicken (6) Turkey (6) Pheasant (7) (7 Exp.) Pigeon (8) Canary (8)
	b. albus	Chicken (3,* 4, 5)
	c. citreus	Pheasant (7)
CAUSE: *Staphylococcus aureus* *albus* *citreus*		
*This may have been fowl plague.		
2. Streptococcus infections Infectious streptomycosis Apoplectiform septicemia Sleeping sickness Schlafkrankheit (Gr.) Schlafsucht (Gr.) Streptokokkenkrankheit (Gr.) Maladie du sommeil (Fr.) Infeccoes estreptococcicas (Port.)		Chicken (9, 10, 11, 12, 13, 14, 112) Duck (17) (9 Exp.) Goose (16) Turkey (14) Pheasant (18) Pigeon (15) (9, 10, 11, 12 Exp.) Parrot (18) Sparrow (12, Exp.)
CAUSE: *Streptococcus capsulatus gallinarum*		
3. Pseudomonas infections	a. aeruginosa	Chicken (19) (180 Exp.) Turkey (180) (180 Exp.) Pigeon (180 Exp.)
	b. hemolisante	Flamingo (Phoenicopterus roseus Paal) (181) Pigeon (181 Exp.)
4. Clostridium infections	a. welchii	Chicken (20, 126, 130) Turkey (125)
	b. oedematis maligni	Chicken (126)
	c. septicum	Turkey (125)
	d. sordellii	Turkey (125)
	e. oedematiens	Chicken (126) (127 Exp.) Swan (127)
	f. novyi	Chicken (126)
CAUSE: *Clostridium welchii, etc.*		

5. Tetanus
   Starrkrampf (Gr.)
   Tetano (Port.)
   CAUSE: *Clostridium tetani*
   Goose (176)*
   Turkey (177)*

*Symptomatic diagnosis.

6. Botulism — Type A
   Limberneck
   Maggot poisoning
   Botulismo (Port.)
   "Wild canary" (Goldfinch) (Spinus sp.) (49)
   California linnet-Common House Finch (Carpodacus mexicanus frontalis) (50)
   Chicken (50)

Type C Alpha

Eared Grebe (Colymbus nigricollis californicus) (48)
Western Grebe (Aechmophorus occidentalis) (48)
White Pelican (Pelecanus erythrorhynchos) (48)
Farallon Cormorant (Phalacrocorax auritus albociliatus) (48)
Treganza's Heron (Ardea herodias treganzai) (48)
Snowy Egret (Egretta thula thula) (48)
Black-crowned Night Heron (Nycticorax nycticorax hoactli) (48)
White-faced Glossy Ibis (Plegadis guarauna) (48)
Canada Goose (Branta canadensis canadensis) (48)
White-fronted Goose (Anser albifrons albifrons (48)
Common Mallard (Anar platyrhynchos platyrhynchos) (48)
Common Black Duck (Anas rubripes) (subsp.)*
Gadwall (Chaulelasmus streperus (48)
Baldpate (Mareca americana) (48)
American Pintail (Dafila acuta tzitzihoa) (48)
Green-winged Teal (Nettion carolinense) (48)
Blue-winged Teal (Querquedula discors) (48)
Cinnamon Teal (Querquedula cyanoptera) (48)
Shoveler (Spatula clypeata) (48)
Redhead (Nyroca americana) (48)
Ring-necked Duck (Nyroca collaris) (48)
Canvasback (Nyroca valisineria) (48)
Lesser Scaup Duck (Nyroca affinis) (48)
American Golden-Eye (Glaucionetta clangula americana) (48)
Buffle-head (Charitonetta albeola) (48)
Ruddy Duck (Erismatura jamaicensis rubida) (48)
Red-breasted Merganser (Mergus serrator) (48)
Marsh Hawk (Circus hudsonius) (48)
Prairie Falcon (Falco mexicanus)
Duck Hawk (Falco peregrinus anatum) (48)
Ring-necked Pheasant (Phasianus colchicus torquatus) (48)
American Coot (Fulica americana americana) (48)
Killdeer (Oxyechus vociferus vociferus) (48)
American Golden Plover (Pluvialis dominica dominica) (48)
Black-bellied Plover (Squatarola squatarola) (48)
Ruddy Turnstone (Arenaria interpres morinella) (48)
Eastern Solitary Sandpiper (Tringa solitaria solitaria) (48)
Western Willet (Catoptrophorus semipalmatus inornatus) (48)
Lesser Yellow-Legs (Totanus flavipes) (48)
American Knot (Calidris canutus rufus) (48)
Baird's Sandpiper (Pisobia bairdi) (48)
Pectoral Sandpiper (Pisobia melanotos) (48)
Least Sandpiper (Pisobia minutilla) (48)
Red-backed Sandpiper (Pelidna alpina sakhalina) (48)
Long-billed Dowitcher (Limnodromus griseus scolopaceus) (48)
Stilt Sandpiper (Micropalama himantopus) (48)
Western Sandpiper (Ereunetes maurii) (48)
Marbled Godwit (Limosa fedoa) (48)

Sanderling (Crocethia alba) (48)
Avocet (Recurvirostra americana) (48)
Black-necked Stilt (Himantopus mexicanus) (48)
Wilson's Phalarope (Steganopus tricolor) (48)
Northern Phalarope (Lobipes lobatus) (48)
Parasitic Jaeger (Stercorarius parasiticus) (48)
California Gull (Larus californicus) (48)
Red-billed Gull (Larus delewarensis) (48)
Franklin's Gull (Larus pipixcan) (48)
Bonaparte's Gull (Larus philadelphia) (48)
Forster's Tern (Sterna forsteri) (48)
Black Tern (Chlidonias nigra surinamensis) (48)
Horned Lark (Otocornis alpestris) (subsp.) (48)
Northern Cliff Swallow (Petrochelidon albifrons albifrons) (48)
American Magpie (Pica pica hudsonia) (48)
American Pipit (Anthus spinoletta rubescens) (48)
Western Meadowlark (Sturnella neglecta) (48)
Yellow-headed Blackbird (Xanthocephalus xanthocephalus) (48)
Nevada Red-winged Blackbird (Agelaius phoeniceus nevadensis ()48)
Rusty Blackbird (Euphagus carolinus) (48)
Brewer's Blackbird (Euphagus cyanocephalus) (48)

Type C	Turkey (136) Nile Goose (51) Gray-backed Duck (51) Pigeon (Exp. 48)
Type D	Ostrich (52) Pigeon (52) Turkey (52)
Type ?	Duck (47) Swan (47) Brown-headed Gull (Larus maculipennis) (48) Trudeau's Tern (Sterna trudeaui) (48) Coot (Fulica armillata) (48) Southern Pintail (Dafila spinicauda) (48) Lapwing (Belonopterus chilensis lampronotus) (48) Brown-headed Gull (48)

CAUSE: *Clostridium botulinum*

Chicken (21, 110)

7. Corynebacterium infections
Preisz—Nocard infections

Turkey (22)
(Gypagus pappa L.) (111)
(Melopsittacus undulatus Shaw) (111)
(Spizaetus coronatus) (111)
(Aquila chrysaetus) (111)

CAUSE: *Corynebacterium ovis*

8. Fowl Cholera
Avian Pasteurellosis
Avian hemorrhagic septicemia
Geflügelcholera (Gr.)
Hühnecholera (Gr.
Hämorrhagische septikämie der Hühner (Gr.)
Choléra des poules (Fr.)
Septicémie hemorrhagique de la poule (Fr.)
Colera dei polli (It.)

Chicken
Duck (84)
Goose (85)
Turkey (86)
Pigeon (87)

Cholera (Port.)
Baromficholera (Hung.)
CAUSE: *Pasteurella avicida*

9. Pseudotuberculosis Infectious necrosis of canary birds Paracholera Parapest of turkeys Algümökór (Hung.) Pseudo-tuberculose (Port.) Pseudotuberkulose (Gr.) Pseudo-tuberculose (Fr.)		Chicken (160) (157, 160 Exp.) Turkey (88, 89, 158, 159) Duck (164) Pigeon (89, 157, 161) (153, 154, 155, 157, 161, Exp.) Pheasant (160) Canary (89, 156, 159 Exp.) (89, 153, 154, 155, 159) Chaffinch (154 Exp.) Siskin (155 Exp.) Tigerfinch (Habropyga amandara L.) (156) Butterfly finch (H. phoenicotis Sws.) (156) (H. melpoda Vieill.) (156) Japanese Titmice (156) Toucan (Rhamphastos cuvieri Gould (163) Toucan (R. ariel Vig.) (163) Swan (Cygnusolor domesticus Auct.) (162) Sparrow (153, 154, 155 Exp.) Blackbird (165)
CAUSE: *Bacillus pseudotuberculosis rodentium*		
10. Tularemia		Quail (38) Ruffed grouse (Bonasa umbellus) (40) (35 Exp.) Sharp-tailed grouse (Pedioecetes phasianellus) (40) Blue grouse (34 Exp.) Sage hen (39) Ring-necked pheasant (36, 37 Exp.) Pigeon (36 Exp.) Chicken (131 Exp.) Hungarian partridge (36 Exp.) Eastern red-tailed hawk (Buteo borealis borealis Gmelin) (132 Exp.) Red shouldered hawk (Buteo lineatis lineatis Gmelin) (132 Exp.)
CAUSE: *Pasteurella Tularense*		
11. Brucellosis La fiévre de Malte (Fr.) Brucellose (Port.)	a. abortus	Chicken (41, 134) (134 Exp.) Turkey (42 Exp.) Pigeon (42 Exp.) Pheasant (42 Exp.) Duck (133) (42 Exp.) Goose (42 Exp.) Guinea fowl (42 Exp.)
	b. melitensis	Chicken (133) (?)
CAUSE: *Brucella abortus: B. melitensis*		
12. Bacillary coryza Fowl coryza (sudden onset, short course) Nasenkatarrh (Gr.) Coryza (Fr.) Corizza infettiva dei polli (It.) Coriza (Sp.) Corysa infectiosa (Port.) CAUSE: *Hemophilus gallinarum*		Chicken (105)
13. Coccobacilliform coryza (slow onset, long course) CAUSE: *Coccobacilliform bodies*		Chicken (182)

14.	Goose influenza Septicemia exudative anserum (102) Gänseinfluenza (Gr.) (104) Riemersche Gänseuche (Gr.) Ansteckende Luftsackentzündung der Gänse (103) Influenza dos gansos (Port.) A libák Izzadmányos septikaemíája CAUSE: *Bacillus septicaemia anserum*	Goose (I02) Duck (Exp. 102)
15.	Pfeifferella infection CAUSE: *Pfeifferella anatipestifer*	Duck (44, 135) (135 Exp.)
16.	Erysipelothrix rhusiopathiae infection Swine erysipelas Rotlauf (Gr.) Rotlaufseptikämie der Vögel (Gr.) Geflügelrotlauf (Gr.) Rouget (Fr.) Mal rossino (Ital.) Ruiva (Port.) CAUSE: *Erysipelothrix rhusiopathiae*	Chicken (24, 25, 28, 113, 118) (24, 25, 28, 30, 114, 116, Exp.) Turkey (23, 27, 30, 115, 116, 122, 123, 124) (23, 115 Exp.) Pigeon (26) (23, 24, 25, 26, 28, 30, 114, 115, 119, 120 Exp.) Duck (26, 27, 117, 119) (119 Exp.) Quail (29, 120) Pheasant (114) (114 Exp.) Coot (29) Thrush (29 Parrot (29) Ostrich (Struthio camelush.) (121) Owl (118) Crane (118) Flicker (183 Exp.) Yellow hammer (183 Exp.) (Rhea Americana L.) (121)
17.	Anthrax Milzbrand (Gr.) Charbon (Fr.) Carbonchio ematico (It.) Carbunculo (Port.) CAUSE: *Bacillus anthracis*	Ostrich (31, 32) Fowl (33 Exp.) Duck (128, 129) Pigeon (Exp.) Canary (Exp.) Jay (Exp.) Hawk (Exp.) Crow (Exp.) Sparrow (Exp.) Finch (Exp.) Robin (Exp.)
18.	Tuberculosis a. avian Tuberkulose (Gr.) Tuberculose (Fr.) Tubercolosi (It.) Tuberculose (Port.) Baromfigümökor (Hung.)	European Avocet (Recurvirostra avosetta L.) (184) Canary (100, 168) Cowbird (Molothrus ater) (95) Blackbird (Turdus merula) (174) White Crested bittern (Tigriornis Leucolopha) (Jardine) (184) Honey buzzard (Pernis apivorus L.) (184) European Oyster Catcher (Haematopus ostralegus) (184) Chicken Demoiselle Crane (Anthropoides virgo L.) (184) Two-barred crossbill (Loxia bifasciata Brehm) (184) Crow (Cowus brachyrhynchos) (96, 173) Ground Dove (Columbigallina Passerina) (Linn.) (184)

(*Continued from right hand column of preceding page*)

Goeffroy's Dove (Claravis geoffroyi) (Tenim.) (184)
Indian Emerald Dove (Chalcophaps indica L.) (184)
Ring-dove (Streptopelia risoria) (Linn.) (184)
Stock-dove (Columba oenas) (Linn.) (184)
Turtle dove (Streptopelia turtur) (L.) (184)
Golden-eye duck (Glaucionetta clangula) (L.) (184)
Gray or spotbill duck (Anas poecilorhyncha) (Forster) (184)
Mallard duck (Anas platyrhynchos) (L.) (184)
Mandarin duck (Dendronessa galericulata) (L.) (184)
Tufted duck (Nyroca fuligula) (L.) (184)
Wood duck (Aix sponsa) (L.) (170, 184)
Booted eagle (Hieraaëtus pennatus) (Gmelin) (184)
Lesser spotted eagle (Aquila pomarina Brehm) (184)
Vulturine fish-eagle (Gypoheirax angolensis) (Gmelin) (184)
(Euplectes orix L.) (109)
(Euplectes taha smith) (109)
(Euplectes macroura muller) (109)
Falcon or duck hawk (Falco peregrinus) (L.) (184)
Feldegg's falcon (Falco biarmicus Feldeggi) (Schlegel) (184)
Western red-legged falcon (Erythropus vespertinus) (Linn.) (184)
Flamingo (Phoenicopterus antiquorum) (Tenim.) (184)
Fowl, East African Spur (Pternistes infuscatus Cab.) (184)
Fowl, Jungle (Gallus gallus) (L.) (184)
Allen's gallinule (Porphyrula alleni) (Thomson) (184)
Purple Gallinule (Porphyrula martinica) (L.) (184)
Angola chanting goshawk (Melierax metabates mechowi cabanis) (184)
Goose (Anser) (97, 184)
Ashy-headed goose (Chloephaga poliocephala) (Gray) (184)
Bean Goose (Anser fabalis) (184)
Guinea hen (Numida galeata pallas) (92, 184)
Black-headed gull (Larus ridubundus) (184)
(Gypagus papa L.) (109)
Gray gyrfalcon (Falco rusticolus) (Candicans) (184)
Hen-harrier (Circus cyaneus) (Linn.) (184)
Marsh harrier (Circus aeruginosul) (184)
Eastern sparrow hawk (Falco S. sparverius) (175)
Rough-legged hawk (Archibuted lagopus) (Pontopiddan) (184)
Little blue heron (Florida caerulea L.) (184)
Sacred Ibis (Threskiornis aethiopica Lath.) (184)
Laughing jackass (Novaeguinea novaeguinea) (184) (Hermann)
Urraca jay (Cyanocorax chrysops) (Vieill) (184)
White-crested kalij (Leucomelanos hamiltoni) (J. E. Gray) (184)
Madagascar kestrel (Cerchneis Newtoni) (Gurney) (184)
South African kestrel (Cerchneis rupicola (Daud.) (184)
Black kite (Milvus migrans) (Bodd.) (184)
Nepal koklas (Pucrasia nipalensis Gould) (184)
East African Purple-crested Lourie (Gallirex chlorochlamys shelley) (184)
Reticulated Lory (Eos reticulata) (S. Müller) (184)
(Neophilemon cockerelli) (Scl.) (184)
Barn owl (Strix pratincola) (172)
Egyptian eagle owl (Bubo ascalaphus) (Savigny) (184)
Spotted eagle owl (Bubo africanus) (Tenim.) (184)
Ostrich (93)
Tui parrakeet (Brotogeris st. thomae) (Müller) (184)
Parrot (100 Exp.)
Common partridge (Europe) (Perdix perdix) (Linn.) (184)
Chukar partridge (Alectoris graeca chukar) (J. E. Gray) (184)
Madagascar partridge (Margaroperdix Madagascariensis) (Scop.) (184)
Stone partridge (Ptilopachus petrosus) (Gmelin) (184)
Javan peafowl (Pavo muticus Linn.) (184)
Peacock (172)
Pheasant (Phasianus) (90, 184)
Elliot's pheasant (Callophasis ellioti Swinhoe) (184)
North China eared pheasant (Crossoptilon Manchuricum, Swinhoe) (184)
Reeve's pheasant (Syrmaticus reevesii) (J. E. Gray) (184)
Silver pheasant (Gennaeus mycthemerus) (L.) (184)
Phonixhuhn (184)
Pigeon (91) (184)

b. human — Parrot (101) (100 Exp.)
Grand electus (Lorius roratus) (167)
Duck (171)

c. bovine — Duck (171)
Parrot (100 Exp.)

d. mammalian — Juggler (Terathopius ecaudatus) (184)
White-throated thrush (Garrulax albigularis) (184)

CAUSE: *Mycobacterium avium*
Mycobacterium tuberculosis, etc. — Sparrow (53)

19. B. cloacae infection		
CAUSE: *B. cloacae*		
20. Colibacillosis*		Chicken (54, 55)
Kilibazillose (Gr.)		Turkey (55)
Kiliseptikämie (Gr.)		Duck
Cholera des Cygnes coscoroba (108)		Pigeon
		Coscoroba Swan (108)
		Goose
CAUSE: *Escherichia coli*		

*Probably a predisposing factor is always essential.

21. Paratyphoid infections	a. Aertrycke	Chicken (56, 137)
		Duck (57, 58, 59,141)
		Turkey (60, 141)
		Pigeon (60, 141)
		Canary (63, 64, 141)
		Parrot (64)
		Parakeet (67)
		European siskin (67)
		Strawberry finch (67)
		Bullfinch (67)
		Goldfinch (67)
		Gray toucan (Schizorhis concolor) (68)
	b. Binns (Storrs)	Pigeons (61, 66)
		Chicken (137)
	c. Newport	Quail (65
		Chicken (141)
		Turkey (141)
	d. Anatum	Chicken (56, 137)
		Duck (57, 58, 59, 141)
		Turkey (141)
	e. Kentucky	Pheasants (141)
		Chicken (138-141)
	f. New Brunswick	Chicken (139, 141)
	g. Minnesota	Turkey (140, 141)
	h. Worthington	Chicken (140, 141)
		Turkey (140, 141)
	i. Newington	Chicken (141)
		Turkey (141)
		Duck (141)
	j. Seftenberg	Chicken (141)
		Turkey (141)
	k. Derby	Turkey (141)
	l. Bredeney	Turkey (141)
	m. Muenchen	Chicken (141)
	n. Bareilly	Turkey (141)
		Chicken (137, 141)
	o. Oranienburg	Chicken (137, 141)
		Quail (141)
	p. Montevideo	Chicken (137, 141)
		Turkey (141
	q. London	Chicken (137)
	r. Amersfoort	Chicken (145)
S. enteritidis	a. Gaertner	Chicken (70)
		Duck (70)
		Turkey (144)
	b. Breslau	Duck (142)
		Goose (142)
	c. Essen	Duck (142)
S. paratyphosus B.		White swan (Cygnus olor Gmelin) (143)
		African pelican (Pelecanus rufescens Gmelin) (143)

	Wild Ducks (Anas platyrhynchos L.) (143) Pigeon (143 Exp.) Duck (143) Exp.) Fowl (143 Exp.)
Type not determined	Goose (67) Pheasant (69) Brown creeper (Certhia familiaris) (67) Chicken
22. Pullorum disease Bacillary white diarrhea Pullorum-Krankheit (Gr.) Weisse Bazilläre Kückenruhr (Gr.) Pullorumseuch (Gr.) Bazilläre Kückendysenterie (Gr.) Malladie pullorum (Fr.) Diarrhée blanche bacillare (Fr.) Enfermedad Pullorum (Sp.) Diarrhea blanca bacilar (Sp.) Diarrhea branca (Port.) Chirkék fehér hasmenése (Hung.) CAUSE: *Salmonella pullorum*	Turkey (71, 81, 149) Pheasant (72) Quail (73) Duck (74, 147, 148) Sparrow (76) Guinea (146) European bullfinch (Pyrrhula europa) (75) (Crossoptilum manchuricum Swinh.) (150)
23. Fowl typhoid Infectious enteritis Epizoötic dysentery Infectious leukemia Avian salmonellosis Hühnertyphus (Gr.) Typhose Aviaire (Fr.) Tifosi aviaria (It.) Tifus aviar (Sp.) Typho aviario (Port.) Baromfityphus (Hung.) CAUSE: *Salmonella gallinarum*	Chicken Turkey (77, 78, 82, 149) Duck (81, 82) Goose (82) Guinea fowl (78, 151) (83 Exp.) Pheasant (80, 82) Grouse (82) Pigeon (82) Swan (82) Coscoroba swan (82) Pea fowl (78) Parrot (79) Sparrow (82) (83 Exp.) Partridge Ostrich
24. Shigella infection CAUSE: *Shigella retgerii*	Chicken (78)
25. Actinobacillosis	Parrot (Amazona aestiva) (179)
26. Listeria infections Listerellosis Listerosis CAUSE: *Listeria monocytogenes* (189)	Chickens (185, 186) (187 Exp., 188 Exp.)
Diseases of Doubtful Nature	
27. Epizoötic pneumopericarditis	Turkey (45) Chicken (45) Pigeon (45 Exp.)
28. Epizoötic pneumoenteritis	Turkey (46) Pigeon (46 Exp.)
29. An infectious disease of ostrich	Ostrich (106) Pigeon (106 Exp.) Finch (106 Exp.) Weaver bird (106 Exp.) "Reisevögel" (106 Exp.)
30. Hemorrhagic septicemia of ring doves	Ring dove (107)

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ABSTRACTS OF PAPERS PRESENTED AT THE WASHINGTON SESSION AUGUST 26-30, 1940

Laboratory Tests of the Potency of Rabies Vaccines

RALPH W. G. WYCKOFF, Ph.D.

The widespread occurrence of rabies is ample evidence of the need for better methods of control. Since the principal reservoir of rabies lies in the dog population, better control can be brought about only by improved policing to restrict the circulation of dogs and by methods of mass vaccination to enhance the natural immunity of dogs. It is unfortunate that recent laboratory work has been interpreted as casting doubt upon the efficacy of such preventive vaccination. This interpretation, though not legitimate, could nevertheless arise only because of a paucity of sound scientific knowledge concerning the vaccines in use and the consequences of their application.

Before any precise evaluation can be put upon the prophylactic vaccination of dogs, two separate problems must be met. The first involves a quantitative study of the immunizing value of available vaccines. The second involves a determination of the degree of immunity that can be conveyed to dogs by vaccines of known potency and a decision as to the dose and mode of vaccination needed to protect them against field exposures to rabies: This combined laboratory and field investigation must in its final aspect be based on a satisfactory solution of the first problem.

In our laboratory we have been developing the first as it presents itself to the manufacturer of vaccines. The present paper is devoted mainly to a statement of results obtained thus far in this investigation. The problem itself is complex and can be approached from a variety of standpoints. Ours has been based on the assumption that the primary responsibility of a manufacturer is to supply a product whose merit can be demonstrated by a scientifically acceptable test and whose quality can be maintained by the routine application of this test.

Because of their cost and variable susceptibility, dogs can not be used for such a test. Webster's extensive work on rabies in mice has, however, supplied a good scientific basis for testing vaccines. Our work is essentially an extension and adaptation of his procedures.

There are a number of steps to be taken for the solution of our problem. The first is the selection of a uniform mouse test simple and inexpensive enough to be used routinely as a common basis for all other work. For a number of reasons Webster's original test could not be used without modification. After a study of the various conditions involved, we have developed a simpler test which will discriminate between potent and weak vaccines and which can feasibly be applied to all manufactured lots of vaccine. As a second step in our program we have sought to gain an understanding of the vaccines we now manufacture by subjecting many lots of both human and canine rabies vaccines to this test. We next tested a number of competitor vaccines under the same conditions. The virus used in these tests to measure the immunity resulting from vaccination was the fixed strain carried by this laboratory. Since there is every reason to assume that fixed strains have been modified by prolonged cultivation, we then compared the immunity provided by various vaccines when challenged by different strains of fixed virus and by recently isolated "street" virus. The results of these experiments

supported the assumption of differences between strains and immediately raised the question as to whether or not vaccines made with different strains are equally effective in inducing immunity. We have accordingly made experimental vaccines with each of these fixed viruses, always following the same manufacturing procedure, and have tested them against homologous and heterologous viruses.

It is our belief that we already have two important practical results. In the first place this work provides a satisfactory basis for further experiments, now under way, designed to establish such important points as the keeping qualities of rabies vaccines, the optimal conditions for their manufacture, etc. Likewise of immediate practical importance is the proof that though a considerable amount of the canine rabies vaccine now on the market is too weak to immunize mice, it is nevertheless scientifically possible and economically feasible to produce vaccines of a demonstrable potency. There thus remains no valid scientific reason for the continued sale and use of clearly impotent vaccines. We believe that the elimination of such vaccines through the enforced routine application of a fair mouse test is a step that could profitably be taken at once. By helping to restore a proper confidence in the value of widespread canine vaccination it would inevitably assist in the better control of rabies which is now urgently needed.

Purification and Properties of the Equine Encephalomyelitis and Rabbit-Papilloma Viruses

JOSEPH W. BEARD, M.D.

The purpose of this presentation is to discuss the isolation and properties of certain purified filtrable agents pathogenic for animals. Several representatives of this group of viruses were obtained in a more or less pure state, but the discussion here is limited primarily to findings with the agent responsible for papillomatosis in rabbits and those (eastern and western strains) causing encephalomyelitis in horses.

The procedures notably successful in yielding purified preparations of animal viruses consisted chiefly in the utilization of differential centrifugation. The larger viruses, such as the elementary bodies of vaccinia, are readily isolated by relatively low-speed spinning in the angle centrifuge; for the smaller agents, such as the papilloma virus and the virus of equine encephalomyelitis, however, the high-speed, air-driven, quantity ultracentrifuge is used. The procedures consisted essentially in the application of repeated cycles of alternate low- and high-speed centrifugations in ultracentrifugal fields found empirically to eliminate contaminants and to yield pure products. The processes of purification were directed and followed by parallel analyses of the respective products in the analytical ultracentrifuge.

Isolation of the rabbit-papilloma virus from infectious extracts of cottontail-rabbit warts was reported three years ago. The purified material exhibited the characters of a macromolecular species of high homogeneity on examination in the analytical ultracentrifuge. Chemical analysis showed that the material was essentially protein in nature, containing but a small amount of fat which may have been an impurity carried over in the processes of purification. This protein possessed the properties of the virus.

Due somewhat to the relatively small amounts of the pure virus obtainable, but primarily to certain of its properties soon encountered, the papilloma virus available in the past two years has been employed mainly in biological investigations. These have included studies based on the infectivity of the virus. In addition to relative stability, the virus possessed other qualities adapting it for biological work. The incubation period of warts induced by it varies from 6 to 35 days and the period was found to be proportional to the concentration of virus in any inoculum. The application of appropriate measures for analyzing titra-

tion findings resulted in a procedure for accurately estimating infectivity on the basis of incubation-period results. By this means, the purified product was found to be remarkably uniform in its biological character and readily susceptible to quantitative study under standardized conditions. On the basis of physical, chemical and biological findings, the absolute infectivity of the virus has been described. Investigations in this field have provided a basis for the elucidation of questions concerned with the influence of host factors on test-animal response, not only to the papilloma virus but to vaccinia virus as well. Studies on virus neutralization have been productive of findings concerned with the quantitative relations of virus and homologous immune serum expressible in mathematical terms.

Work with extracts of chick embryos diseased with equine encephalomyelitis virus has resulted in the purification of both eastern and western strains of this agent. These strains have been obtained as homogeneous preparations which exhibit the properties of the respective strains. Attention has been centered thus far chiefly on the eastern strain. Analyses of the pure virus with respect to its essential components reveal that it is composed of protein and fat, the latter being present in larger quantity. The material contains also nucleic acid of the yeast type. Elementary analyses have been made and these have indicated the chemical uniformity of the product. Methods have not yet been developed for quantitative infectivity studies, but preliminary work indicates a high infectiousness of the order of 1 to 10 molecules per infectious unit. Measurements have been made on the viscosity of virus solutions and the specific volume of the virus. The findings thus far suggest that the molecule is a prolate ellipsoid whose axial ratio is about 25. These results, in conjunction with those on the rate of sedimentation in the analytical ultracentrifuge, indicate a molecular weight of about 130,000,000.

Crude extracts of chick embryos diseased with equine encephalomyelitis treated with formalin lose all infectivity and subsequently possess the capacity to immunize against the active virus. Vaccines prepared in this way have found widespread application in the protection of horses in the field. The nature of the immunizing material has been the subject of much study. Information in this respect has been afforded by formolization of the purified virus under controlled conditions. The product of such procedures has been practically indistinguishable by means of the analytical ultracentrifuge from the untreated virus, indicating that the essential immunizing component is comprised in the main of an inactive formalin product of the virus. Under proper conditions, an identical material can be obtained from the crude vaccines.

An outcome of studies of the purified virus and vaccines is the recent development of a procedure for the practical concentration and purification of the immunizing component of the crude vaccines. This procedure is readily applicable to large-scale production of a superior vaccine that may prove of practical value in the field. Tests of the purified and concentrated product in guinea pigs indicate an effectiveness comparable with that of the crude vaccine thus far employed in the control of the disease in the field.

Canine Rabies Vaccination. An Experimental Study of the Efficacy of the Single Intraperitoneal Injection Method with Phenol-Treated Vaccine

HARALD N. JOHNSON, M.D., and
CHAS. N. LEACH, M.D.

The results of an experiment to determine the antigenic value of a 5-cc. intraperitoneal dose of a commercial phenol-treated canine rabies vaccine are reported. This vaccine was tested by subcutaneous

inoculation and the results reported in a previous publication.

A dog-brain street virus in a 10 per cent suspension was employed as a test inoculum and was administered in 0.5-cc. amounts into each masseter muscle. This test injection was given 30 to 34 days after vaccination.

When vaccinated intraperitoneally with 5 cc. of a phenol-treated commercial canine rabies vaccine, 36.5 per cent of a group of 52 vaccinated dogs developed rabies as compared with 54 per cent of 63 unvaccinated dogs.

The 5-cc. dose of commercial vaccine when given subcutaneously confers a higher degree of protection. Of 108 dogs vaccinated subcutaneously with this vaccine, 24.1 per cent died of rabies following test-virus inoculation while 55 per cent of 120 unvaccinated dogs succumbed to the disease after administration of the test virus.

Twenty-Five Years' Progress in the Study of Brucellosis

I. FOREST HUDDLESON, D.V.M., M.S., Ph.D.

Progress in the field of brucellosis research during the past 25 years has been so constant that many investigators, either new to the field or slow to accept established facts, have not recognized certain proved entities concerning this disease, with the result that they have been wasting time and money on studies already adequately approached. For example, it was shown many years ago that healthy young calves can not be permanently infected with brucellosis, yet this fact has been generally accepted for but a short time. As much is known of the habits and characteristics of all species of Brucella as of any other organism, yet sanitarians in whose hands the control of brucellosis is placed do not make full use of this knowledge.

Only recently has consideration been given to the size of the infective dose of Brucella organisms—apparently about one million. A large infective dose results in an agglutination titre in 14 to 28 days; a dose of less than one million in 80 to 106 days, if at all.

Brucellosis of swine is prevalent in the United States, South America, Mexico and Central Europe, both *Brucella suis* and *Br. melitensis* being involved. Swine are not infected naturally by *Br. abortus*. It is said that more than 30 per cent of the hogs in Mexico are infected by *Br. melitensis*. *Br. suis* infection is common in cattle of the southern United States.

Vaccine to Control Brucellosis in Cattle

C. M. HARING, D.V.M., and JACOB TRAUM, D.V.M.

Vaccine consisting of suspensions of *Brucella abortus*, BAI strain 19, has been used for seven years and answers have been found to some of the questions which were raised when the method was first announced.

I. What measurable protection is conferred by vaccination with strain 19? The vaccine has given a high degree of protection against brucellosis. In most of the herds no precautions were taken to keep vaccinated heifers separate from aborting cows. Data show that 2,872 parturitions of vaccinated animals yielded 94.1 per cent normal calves, whereas 1,763 parturitions of the older nonvaccinated cows in these dairies, including both negative and reacting animals, resulted in only 86.1 per cent normal living calves. In four large herds kept relatively free from brucellosis by frequent blood tests and removal of reactors, 6,860 parturitions yielded 93.6 per cent normal calves, which is slightly less than the percentage stated above for vaccinated animals in infected herds. Colostrum and uterine material from 40 abortions or stillbirths in vaccinated animals were tested by guinea pig inoculations, and virulent Brucella was found in five (12.5%) of these cases. In addition, 369 samples from vaccinated animals at times of normal calving showed *Br. abortus* to be present at three (.8%) of these parturitions. Two vaccinated animals have shown a tolerance for virulent *Br. abortus* which is character-

ized by the shedding of the organisms without the development of agglutinins in the blood or milk serum, or other signs of brucellosis.

II. Can the systematic vaccination of calves in infected herds ultimately result in the complete eradication of brucellosis? In so-called problem herds where new cases of brucellosis continue to appear in spite of frequent tests and the prompt removal of reactors, a program of calfhood vaccination is especially to be recommended. When combined with a test-and-slaughter program, calfhood vaccination usually hastens complete eradication. In a herd where reactors were removed only as they became unprofitable producers, the vaccination of nonpregnant heifers regardless of age, followed by the systematic vaccination of calves, resulted in the complete disappearance of the disease in six years.

III. What conditions favor best results from vaccination? It is recommended that all heifers be blood tested at the time of vaccination and again three to six weeks later in order to measure the antigenic effect of the vaccination. If a heifer fails to show an agglutination titre as a result of vaccination, it may be desirable to revaccinate. If a considerable number of animals fail to show titres of 1:200 or higher, the potency of the particular lot of vaccine should be questioned.

Association of nonpregnant vaccinated heifers with infected and aborting cows may increase the resistance conferred by the vaccine, but such association during the last six months of a heifer's pregnancy may result in clinical brucellosis. The resistance conferred by the vaccine has been observed to have been overwhelmed in pregnant heifers by close association with aborting cows.

IV. How long after vaccination will animals remain reactors to the agglutination test? This depends upon at least three factors: 1) the age of vaccination, 2) whether or not the animal is subsequently exposed to virulent Brucella organisms, and 3) the relative proportion of rough (R) and smooth (S) types of organisms in the particular serial of vaccine used. It may be anticipated that over 95 per cent of calves vaccinated before 8 months of age will be negative before their first calving.

V. Is it ever desirable to use the vaccine in herds that are free from brucellosis? It was found desirable to use strain 19 for calfhood vaccination in certain herds free from brucellosis where there was danger of the introduction of the disease. Thus far there have been no ill effects observed by the writers from vaccinating calves between the ages of 6 and 10 months in noninfected herds.

VI. What justification is there for the vaccination of adult cattle? Beneficial effects have been obtained by the writers from the vaccination of nonreacting nonpregnant cows in herds where brucellosis was spreading. On the other hand, apparently no benefit resulted from the vaccination of reacting cows.

VII. Is vaccination still in the experimental stage? Vaccine serials now in use differ in the proportion of smooth (S), intermediate (I) and rough (R) type organisms. Such differences are accompanied by fluctuations in antigenic and pathogenic power of the vaccine suspensions. Progress is being made in methods to control dissociation and otherwise to improve and standardize the manufacture and use of the vaccine, and until these come into general use, even if there were no other reasons, the writers consider vaccination with strain 19 to be still in the experimental stage.

The Need and Significance of Veterinary Preventive Medicine in Present-Day Veterinary Education

A. F. SCHALK, D.V.M.

Scientific discoveries during the past 75 years have established a sound basis for the field of preventive medicine and at the present time it is practically as accurate a field of scientific endeavor as any other

branch of medicine. Perhaps the most restraining factor in its growth and development was that clinical medicine was emphasized so much that it thoroughly dominated the domain of medicine. There was neither time nor place for it in medical curricula.

Veterinary medicine has apparently lacked vision and perspective in this movement as compared with human medicine. Practically every first-class medical school in the land points with pride to its well-organized department of preventive medicine. It is regrettable that we can not do likewise.

We seem to be wavering, pondering, waiting. For what? Possibly new and further inspiration, consciousness and vision on the subject. If we will but analyze the status, appraise the need and correctly interpret and evaluate the trends and indications in veterinary medicine, the evidence will clearly warrant the necessity for methodical preventive medicine in our colleges.

Each succeeding year renders public health more dependent upon veterinary medicine, especially in its preventive phases. Animal diseases transmissible to the human family are becoming so numerous as to constitute a serious menace to public health. Aside from the direct transmission possibilities of these diseases, the additional and perhaps greater source and threat to human health is the large number of these diseases that may be contracted by people through the consumption of foods of animal origin. It is needless to state that a large amount of the veterinary service required in this control work falls primarily in the domain of veterinary preventive medicine and sanitary science.

Briefly, a definite field of veterinary preventive medicine exists; it constitutes a major field in our profession; it perhaps exceeds all other fields in regard to economic importance to the livestock industry and it is indispensable to public health. There is an apparent immediate need for veterinary colleges to incorporate it in their curricula as a major subject so that systematic instruction can be given in this important work.

But What About Poultry?

CLIFF D. CARPENTER, D.V.M., M.S.

A summary of the status of the control of poultry diseases in the field is given. The poultry industry earns an annual income of one billion dollars, second only to dairy products, and has grown more rapidly than any other branch of animal industry.

This rapid growth and the fact that more than 5 million farmers have poultry flocks, most of which are not the main source of income, present a veterinary problem requiring careful study.

An analysis of the problems and recommendations for meeting them are presented.

The Rôle of the Veterinarian in Effective Immunization Against Hog Cholera with Tissue Vaccine

WILLIAM H. BOYNTON, D.V.M., GLADYS M. WOODS, M.A., and F. W. WOOD, D.V.M.

Hog-cholera tissue vaccine is a suspension of finely ground virus tissue collected from pigs in the acute stages of cholera, and treated with eucalyptol, by which the disease-producing properties are lost while the immunizing properties are retained. Thus, it can be used safely on pigs without risk of spreading infection to any unimmunized pigs in the herd or of bringing about "breaks" from intercurrent infections.

This vaccine is purely prophylactic and requires a period of three weeks to induce a satisfactory immunity to cholera.

The dosage of tissue vaccine for pigs of all ages is 5 cc. and injections are made intramuscularly into the axillary space, or intraperitoneally.

Aseptic and sanitary precautions must be observed in handling pigs during vaccination and following the immunization treatment. Instruments and equipment

used for the administration of vaccine should be properly sterilized before use and should be handled carefully during the process of vaccination; clothing and other materials which may have been employed for serum-virus immunization should not be used under any circumstances for the administration of hog-cholera tissue vaccine to susceptible pigs, unless such equipment and clothing have been cleaned and sterilized.

The diagnosis of cholera is not always an easy task and the field veterinarian is usually confronted with the problem of outlining to the owner a safe plan of procedure.

This plan is based on the conditions encountered, and these fall, roughly, into six classes: 1) pigs on cholera-free premises and under sanitary surroundings; 2) pigs on cholera-free premises, but under unsanitary surroundings; 3) home-bred pigs and recently purchased feeder pigs on cholera-free premises; 4) pigs on cholera-infected premises; 5) garbage-fed pigs; 6) feedlot pigs purchased from all sources, and those purchased from community and coöperative auction sales yards. The method of procedure is given for each class.

By the procedures described, immunity can be produced without the introduction of active virus upon the premises and, therefore, without the consequent risks of losses from serum-virus reactions and of setting up new foci of infection.

Diseases of Swine Due to Nutritive Deficiencies

H. C. H. KERNKAMP, D.V.M., M.S.

The importance and physiological functions of essential nutritive substances in the diets of swine are briefly discussed. An appreciation of the requirements and specific needs for these substances serves as the basis for recognizing and interpreting the pathological effects produced when a deficiency exists. Disturbances produced by deficiencies in the water, protein and certain of the mineral elements and vitamins are stressed in particular. The conditions under which deficiency diseases are most likely to occur and the clinical and necropsy manifestations characteristic of them are presented. Therapeutic measures for the treatment and prevention of deficiency diseases are suggested and a discussion of interrelationships between nutritive deficiencies and certain other disease-producing agencies is included.

Acetonemia in Dairy Cattle

W. A. BARNETTE, B.S., D.V.M.

Acetonemia of cattle may be of the parturient or nonparturient type and usually occurs in well-fed, high-producing cattle, although experience has shown that these conditions do not always prevail when typical cases occur. For the present, we believe that a carbohydrate deficiency is a consistent factor. At least, where acetonemia symptoms occur, the history indicates the feeding of little or no carbohydrates with a bulk of the ration of protein origin.

OCCURRENCE

The disease seems to be no respecter of the dairy-type breeds. It may appear alone, or along with other diseases, for example, hemorrhagic septicemia, mastitis and pneumonia, which are common in different localities at various seasons of the year. The age at which acetonemia occurs will vary from well-advanced pregnant heifers to mature cows of the average age of production up to 12 or 14 years, depending upon care, feeding and handling.

SYMPTOMS

To classify acetonemia for field purposes, we shall consider the two groups most commonly seen—parturient and nonparturient—not taking into consideration various complications. Parturient cases appear, as a rule, about 48 hours before or after parturition. We find, as a rule, the typical milk-fever symptoms; other types occurring at the same time or without true milk-fever symptoms seem to be caused by reproductive disturbance, retained placenta and coördinated affections.

Nonparturient cases usually occur from

seven days to a few months after parturition. Such cases apparently are due to a digestive or assimilative deficiency. Accompanying the nervous type may be complications of diseases and in rare cases symptoms of pseudo-milk fever.

PROGNOSIS

Parturient cases generally are fatal unless treated. Nonparturient cases may not be fatal, but they are costly to the producer.

TREATMENT

The value of calcium gluconate is well established and the usual procedure is to give 250 cc. of a 23 per cent solution intravenously and 150 cc. subcutaneously or intramuscularly. In cases where the results with calcium gluconate have not been satisfactory, 100 cc. of anterior pituitary extract administered intramuscularly has proved beneficial. In atypical cases not responding to regular treatment, the magnesium content of the blood may be low. In these cases 150 to 200 cc. of a 20 per cent solution of magnesium sulfate given subcutaneously is indicated.

In nonparturient cases, varied treatment may be indicated. The licking type usually responds to calcium-gluconate injection and 15 Gm. (.5 oz.) of chloral hydrate orally twice daily for two or three days. Errors in feeding should be corrected and cheap syrup, dextrose or brown sugar given.

The Physiology of Ketone-Body Formation

C. E. HAYDEN, A.B., D.V.M.

The ketone or acetone bodies are defined as the three compounds which are acetone, aceto-acetic acid and β-hydroxybutyric acid. Their formation and disposal in normal physiological processes is discussed and attributed to the proper metabolic balance of the fats and carbohydrates and to the normal functioning of the liver. The possible rôle of certain glands of internal secretion and of certain vitamins is considered. It is emphasized that the increased formation of the ketone bodies leads to ketosis. This increased formation is related to disturbance in carbohydrate-fat metabolism. Factors which may lead to this disturbance include a lack of carbohydrates, the activity of the liver, possible alterations in endocrine function and certain vitamin deficiencies. The high incidence of ketosis at or near parturition is discussed and inferences are drawn.

A short review of recent research papers which contribute to our knowledge of increased ketone-body formation is a part of the discussion.

Two sets of reagents, which serve as reliable indicators of the presence of ketone bodies in the urine, are discussed.

Some Present-Day Problems in Clinical Diagnosis

C. H. COVAULT, D.V.M.

This discussion of problems in the field of general practice is conducted on the premise that more can be learned from a careful study of a mistaken diagnosis than from a correct one, provided the analysis made is carried out patiently and systematically.

The causes for mistaken diagnoses are considered to be ignorance, insufficient examination and errors in judgment. Each of these causes is analyzed and examples of mistakes that have been made because of each are used throughout the discussion. The outline followed is a slight modification of one suggested by a French physician, Martinet.

I. Ignorance: a) gross ignorance, b) relative ignorance, c) wilful ignorance, and d) conditions that can not be diagnosed at the time.

II. Faulty examination: a) bad habits in diagnosis, b) defective diagnostic procedure, c) examination under unfavorable conditions, d) unsatisfactory patients, e) unsatisfactory clients, and f) faulty technic.

III. Errors in judgment: a) ignorance, b) obsession, c) false reasoning, d) pusillanimity, and e) pride and vanity.

We believe that all human weaknesses which interfere with success in diagnostic efforts are covered in this outline.

The veterinarian in general practice has but one thing to sell: service. To justify his existence in the community he must render an economic service. To render maximum service he must be a good diagnostician. Diagnosis and treatment are the two essential acts in the practice of veterinary medicine. Treatment, although the principal object in view, is dependent upon and subordinate to diagnosis.

Gastrointestinal Parasites of Sheep and Their Control

R. E. REBRASSIER, D.V.M., M.Sc.

The parasites inhabiting the gastrointestinal tract of sheep cause a greater economic loss than all other diseases of this species. The control of parasitism constitutes the biggest problem in sheep practice. There are no symptoms of intestinal parasitism in sheep that can be considered characteristic, and the severity of infection can be judged accurately only by an autopsy.

Some species of parasites inhabiting the intestinal tract of sheep are readily seen and recognized, but several species are very small and thread-like and a careful examination is required to locate them. It is necessary to make scrapings of the mucosa and place them in a container partly filled with water. Examination of this material will usually enable the operator to observe the parasites.

The problem of controlling gastrointestinal parasites of sheep should be considered from two standpoints, namely, management and anthelmintics. Any system of management should be considered in terms of two periods—the pre-weaning and the post-weaning or pasture period. Lambs should be held in the barn at all times up to weaning time and the dams kept separate from their young, except for nursing periods. It has been determined that in most instances this procedure will enable the lambs to be raised to weaning time with practically no parasite infection. At weaning time the lambs should be placed in a pasture separate from the adult sheep. This pasture should have been free from sheep for at least 18 months. It is advisable, if at all possible, to change the pasture area several times during the pasture season. Many larvae are destroyed during a two- or three-week interval if they are unable to reach a host. Large pastures may be divided into smaller areas by temporary fencing in order to arrange rotation at two- to three-week periods.

Nutrition plays an important part in the control of parasitism. Well-nourished animals are much more resistant to the effects of parasite invasion than are animals in poor condition. In any system of parasite control it is essential to supplement pasture grazing with grain. This procedure is well worth the time and expense involved.

While the gastrointestinal parasites of sheep may be kept under control by a system of management, it is not always practical to depend upon this alone as many flock owners are forced to use permanent pastures. For this reason the use of an efficient anthelmintic is helpful in a control program and should be employed as an adjunct to management.

Anthelmintic treatment should be administered during the grazing period and during the winter period. The most important time to use anthelmintics is during the grazing period, as the most injury is done to lambs during that time. Since the life cycle of most of the parasites affecting sheep covers 22 days, the usual practice is to administer anthelmintics every 21 days during the grazing period. Many different preparations have been used as anthelmintics, but our investigations have shown that the best results are obtained with tetrachlorethylene and the combination of nicotine sulfate and copper sulfate.

Very little consideration has been given to the elimination of intestinal parasites from sheep during the winter period. If an attempt is to be made to control infec-

tion in lambs on pasture, the winter carry-over in adult sheep should be reduced to a minimum. This will aid to a great degree in keeping pasture infection at a low level, especially during the early weeks of grazing. Our investigations have shown that there is considerable carry-over of parasite infection in adult animals during the winter period and also that this infection can be largely eliminated by treatment at regular intervals.

The control of gastrointestinal parasites of sheep can not be accomplished alone, under practical conditions, by either management, nutrition, anthelmintics, or any other one factor. The best plan is to employ all of the above factors to the extent allowed by conditions on the farm.

The Effects of Disease on the Calcium, Inorganic Phosphorus, and Serum Proteins of Horse Blood

A. HENRY CRAIGE, JR., V.M.D., and JOHN D. GADD, V.M.D.

Serum Ca, inorganic P, and protein findings have been studied in a series of clinical cases among horses. Attention has been directed particularly to coördinating these findings in the manner suggested in a former report. It has been possible thereby to identify distinct deviations in blood Ca and P in many cases which might have escaped detection were the examination confined to total Ca and inorganic P. Horses with active bone lesions, *e.g.*, acute and subacute inflammations, revealed a high incidence of blood deficit, varying from moderate to marked reduction from the normal in Ca^{++} and P; but cases with only inactive lesions, *e.g.*, chronic exostoses, were seldom affected significantly.

Among other forms of disease, a slight tendency toward hypocalcemia was encountered where inflammation involved the respiratory system, and diarrhea was associated with distinct reductions in both Ca and P. On the other hand, hypocalcemia was never encountered in cases with symptoms of tetany and various other manifestations of nervous instability, although low P was identified in two cases of muscular incoördination. The results from examinations on horses with spontaneous epistaxis ("bleeders") fail to reveal any basis for attributing the syndrome to Ca deficiency.

Digestive Diseases of Ruminants Resulting from Abnormal Conditions Affecting the Fore Stomachs

R. A. McINTOSH, M.D.V., B.V.Sc.

Overloading of the Rumen

Overloading of the rumen is chiefly incidental in character, occurring when cattle are afforded the opportunity, accidentally or otherwise, of gorging themselves on food which is particularly palatable to them. The symptoms are well known and in the handling of such cases, ruminatorics are essential, for it is obvious that the mass of food in the rumen can not be dislodged until motion in the viscera is restored. When the patient shows dullness and stupidity, the use of sodium hyposulfite intravenously is indicated since the stupor manifested in these cases is undoubtedly due to some toxic agent derived from the fermenting food in the rumen. In some instances operative measures must be taken to relieve the condition.

Impaction of the Rumen

Impaction of the rumen differs from overloading in that the accumulation of the mass of food in typical cases occurs more slowly, the appetite may not be as seriously affected, the symptoms are not as acute and the ingesta are more solid. Much the same form of treatment is indicated, but a greater length of time is required. Here again, in some instances operative measures will have to be resorted to in order to correct the condition.

Tympany

The consumption of wilted legumes on excessively hot days tends to cause tympany. This is due in part to the chemical character of wilted legume and also to

overheating of the animals. When pastures are without shade, cattle exposed to the sun's rays become overheated and their digestive functions are in abeyance, bloat soon following. Alfalfa grown on run-down soil is apparently more provocative of tympany than that produced on well-fertilized land. Some forms of indigestion and bloat are associated with pulmonary and subcutaneous emphysema. This is particulary true when rape is used as fall pasturage and frosts occur at night.

The treatment must be aimed at the relief of abdominal distention by the use of a trocar or stomach tube and the patient should be stood high in front in acute cases. Next, agents should be administered which will arrest fermentation in the rumen content so as to prevent any further formation of gas. These procedures are followed by the use of ruminatorics to stimulate motion in the viscera and finally cathartics to empty out the digestive tract.

GASTROENTERITIS

Gastroenteritis often occurs during the stable-feeding periods of the year in calves and the younger members of the herd. Those forms of the disease having their origin in dietetic errors occur most frequently as the result of the consumption of damaged food, excessive feeding of concentrate mixtures and sudden changes in the character of the diet. Highly bred, sensitive dairy cows are most susceptible.

As a rule, the affected animals are completely off feed, dull and weak, and show signs of exhaustion. Ultimately diarrhea occurs, the severity of which indicates the extent of the inflammatory reaction. Numbers of animals in a herd may be affected from a common cause.

Treatment consists of hygienic measures which insure the comfort of the patient and comprise the provision of suitable quarters, cleanliness and warmth. Irritating material should be removed from the gastrointestinal tract, the most acceptable evacuant being mineral oil for it lubricates and protects the irritated mucosa and tends to inhibit bacterial growth. Protectives and antacids also are indicated and such agents as bismuth subnitrate and sodium bicarbonate are useful. Tannic acid and opium preparations may be used when there is evidence of excessive purging. To combat weakness, strychnine in 0.5-gr. doses three times a day or caffeine may be given. In dehydration from one to two liters of a 25 per cent dextrose solution given intravenously is of value. When recovery is evident, due care should be taken to provide only easily digestible and nutritive foods and when there is evidence of gastrointestinal atonicity, liquor strychninae hydrochloridi and liquor arseni hydrochloricus in equal quantities given in half-ounce doses three times a day make an acceptable mixture to leave with the attendant to administer at regular intervals. The strychnine is stimulating while the arsenic apparently has a favorable influence on the metabolism of the damaged epithelium of the enteric mucosa.

Further Investigations of Rumen Gases and Bloat in Ruminants

R. W. DOUGHERTY, B.S., D.V.M.

Continued checks always have revealed the presence of carbon monoxide (CO) in the rumen gas of experimental cows, the iodine pentoxide method being used. This method is extremely accurate; therefore, it is felt that an average of 0.17 per cent CO by volume in normal rumen gas is much more representative than percentages that have been reported previously by the author.

Hydrogen sulfide (H_2S) has been found in rumen gas, as much as 0.03 per cent by volume. The liquid part of the rumen ingesta yielded 0.22 cc. of H_2S per 100 cc. of liquid, or approximately seven times the amount in an equal volume of gas. Rumen liquid has been saturated with H_2S at 40° C. and found to contain 6.32 cc. per 100 cc. of liquid.

Hydrogen sulfide has been found to be extremely toxic in small, measured amounts when injected into the rumen of sheep and cattle. The symptoms are quite similar to those caused by CO injections, namely,

anoxemia, a diminution of the number and amplitude of rumen contractions and inhibition of the belching apparatus. Recovery, however, is much more rapid.

Extremely small amounts of cystine and methionine have been shown to greatly increase H_2S production *in vitro* and *in vivo*.

Organisms have been isolated in pure cultures that produce tremendous quantities of H_2S when grown in media enriched with cystine.

The concentration of hydrogen sulfide in rumen ingesta can be increased quite consistently by feeding alfalfa and ladino clover, two legumes that are quite often incriminated as causes of bloat. This work indicates that destruction of cystine in the rumen may be quite complete when it is fed orally to ruminants.

Studies on the Relationship of Brucellosis to Periodic Ophthalmia

E. L. STUBBS, V.M.D., and
W. GRAHAM LOVE, V.M.D.

Forty horses, examined and diagnosed as cases of periodic ophthalmia, were bled and subjected to the agglutination test for brucellosis. Twenty-three of these were mares and 17 were geldings. Their ages varied from one year to aged. Thirteen cases were one-eye cases, of which five were in the off eye and eight were in the near eye. Twenty-seven cases involved both eyes. Eighteen were in the active stage when tested and 22 were inactive at the time of test. Six showed slight agglutination in low dilutions and are considered suspicious reactions. All six were in mares varying in age from 2 years to aged. These six included three cases that were in the active state at the time of test and three were inactive. Agglutination in low dilution generally is regarded as suspicious. The number of agglutinations obtained in this series is no greater than that found in testing horses routinely or in horses not affected with periodic ophthalmia. The results obtained from this study give no evidence that there is any relationship between brucellosis and periodic ophthalmia.

Ophthalmology in Equidae

B. J. ERRINGTON, D.V.M., Ph.D.

A clinical examination of the eyes of 2,415 horses has been made as a part of the study of periodic ophthalmia in Equidae which is being carried on at the agricultural experiment station of the University of Kentucky. The purpose is to study normal eyes, variations from normal that have no effect upon the vision, lesions unrelated to periodic ophthalmia and those symptoms and lesions which are related to the disease.

The structure of the eye is such that it offers a better opportunity for clinical examination and study than most other organs of the body. To properly examine an eye it is advisable to include at least three steps in the procedure. These are: 1) naked-eye examination with sunlight as a source of illumination, and including palpation of tension; 2) examination by focal illumination with magnification; and 3) examination with an ophthalmoscope. Other special methods of examination are advantageous to estimate the extent or degree of certain lesions.

Symptoms of conjunctivitis and keratitis which resemble those of periodic ophthalmia can be differentiated from the latter by a thorough examination. Decreased intraocular pressure, which is characteristic of periodic ophthalmia, is important in the prognosis as well as the diagnosis of uveitis in Equidae. Focal illumination is as simple as it is essential in the examination of the anterior structures of the eye. An exudate in the aqueous humor is an indication of the severity of the attack, but it does not occur in all attacks of periodic ophthalmia.

An ophthalmoscope is a necessary part of the equipment in examining eyes. Without it lesions beyond the lens, which are very common in chronic periodic ophthalmia, may not be seen. With little practice a practitioner can obtain the advantage which an ophthalmoscope affords.

Vitreous opacities, which appear in several forms, are commonly seen in aged animals. Many of these opacities apparently are not the result of inflammation. Others can not be differentiated clinically from those seen following attacks of periodic ophthalmia. However, vitreous opacities are the most common lesions seen in acute as well as chronic cases of periodic ophthalmia. Defective vision and blindness also occur in horses, which have never shown acute external symptoms. In these cases the significant clinical change is in the vitreous. If these cases are so-called periodic ophthalmia, there is a chronic form in which the classical acute symptoms of the disease—lacrimation, photophobia and exudate in the aqueous—have not occurred or have not been observed.

Defective sight in chronic periodic ophthalmia is due to occlusion of the pupil from iris adhesions, cataract, vitreous opacities or detached retina. Blindness may result from any one of these lesions, or they may all be present in one case.

Studies on Bovine Mastitis—Mastitis in Heifers

C. C. PALMER, D.V.M., J. C. KAKAVAS, Ph.D., and J. R. HAY, D.V.M.

This report deals with the study of mastitis in 20 heifers. Sixteen of them were members of a Holstein-Friesian herd of approximately 150 cows and heifers (farm I). Four were members of a Guernsey herd of approximately 100 cows and heifers (farm II). On farm I, mastitis was not a problem until the summer of 1938, when acute mastitis appeared suddenly in the milking herd and later in the heifer herd. On farm II, chronic mastitis due to *Streptococcus agalactiae* has been more or less a problem in the milking herd. The mastitis in the heifers was acute. On both farms *Staphylococcus aureus* was the predominating organism isolated from the heifers. The clinical history and pathology are described.

The organisms isolated from heifers with mastitis in 1939 are reported in detail. This study includes 14 cultures of *S. aureus* and two cultures of an unusual streptococcus. As *S. aureus* is present in the udders of many normal cows, the properties of those isolated from acute mastitis are reported in detail for alpha and beta hemolysin production, coagulase production, gelatin liquefaction, color on crystal-violet agar, mannitol fermentation, action on litmus milk, action in contact with staphylococcus bacteriophage, and rabbit-skin inoculation. The infected heifers gave positive agglutination reactions with *S. aureus* antigen, whereas the blood serum of young bulls and noninfected heifers gave negative reactions.

In two heifers an unusual streptococcus appeared to be the predominating organism. These cultures produced minute alpha hemolytic, slow-growing, pin-point colonies on ox-blood-agar plates. They were almost identical in the two animals, differing only in their ability to ferment trehalose. Reactions of these cultures were studied on litmus milk, sodium hippurate, mannitol, inulin, salicin, trehalose, sorbitol and aesculin. They were tested biochemically for Lancefield grouping and were not Lancefield A, B or C.

In the milk of the mature cows infected with acute staphylococcic mastitis which made spontaneous recoveries, a lysogenic substance specific for *S. aureus* carried in the udder was demonstrated. This substance, unquestionably a bacteriophage, was not present in the udder exudate of the infected heifers. This bacteriophage was cultivated in the laboratory and was employed therapeutically. It was applied externally to the udders of noninfected heifers and injected into the udders of infected heifers. In the case of young heifers with nonfunctioning udders, this treatment appeared to give satisfactory results. These heifers when fresh have freshened with normal udders, whereas those treated by warm fomentations and stripping freshened with "blind quarters," nonsecreting quarters or quarters giving abnormal milk. In the heifers with functioning udders, "springing" or recently fresh, at the time

of infection, the bacteriophage therapy was of doubtful value.

The Comparative Accuracy of the Electrometric Method in the Diagnosis of Mastitis

ERNEST C. McCULLOCH, D.V.M., M.A., Ph.D.

Critical comparisons on more than 3,000 samples show the electrical conductivity of quarter samples of milk to parallel closely the chloride content, when due allowance is made for the errors known to occur with the usual method of chloride titration. A reasonably good correlation also exists between increased electrical conductivity, increased leucocyte content and decreased acidity. Electrical conductivity, leucocyte and pH tests sometimes are positive without the milk containing appreciable numbers of streptococci or other microörganisms; these tests rarely are negative when appreciable numbers of microörganisms are present in freshly drawn quarter samples.

A device will be described and demonstrated which makes possible the rapid and accurate determination of the electrical conductivity of quarter samples of milk as they are drawn. The data indicate the electrical conductivity method, as applied to quarter samples, to be a reliable and convenient field test for the detection of abnormal milk.

Efficiency of the Microscopic Examination of Incubated Milk Samples for the Detection of Mastitis Streptococci

ALBERT L. KLECKNER, Ph.D.

The efficiency of the microscopic examination of quarter samples of milk after incubation is compared with the blood-agar plate method. In cows with quarters free from mastitis streptococci, the microscopic test showed 2.9 per cent false positives, due to the presence of saprophytic streptococci in occasional samples. In quarter samples from cows with known-infected quarters, the blood-agar plate method failed to detect mastitis-streptococcus infection in 11.3 per cent of the samples tested, making it approximately 87 per cent efficient as compared with the approximate 100 per cent efficiency (0.3 per cent false negatives) of the microscopic examination.

The results obtained in the examination of samples of milk from each quarter of the udder are compared with those obtained in the examination of composite samples from each cow. Composite samples from known-infected cows were all found to be infected on microscopic examination after incubation. Out of 464 composite samples collected from 85 cows classed as noninfected on prior examinations of quarter samples, those from five cows showed evidence of infection on microscopic examination after incubation. This was confirmed by the isolation of *Streptococcus agalactiae* from the blood-agar plates made from quarter samples obtained from these cows shortly after the microscopic examination was made. These were apparently new infections.

The microscopic examination of milk samples after incubation is a rapid, convenient and reliable method for the detection of infection with mastitis streptococci and requires less labor and equipment than the blood-agar plate method.

Bang's Disease

C. F. CLARK, D.V.M., and E. T. HALLMAN, D.V.M.

1. Variations in Blood-Agglutination Tests

A study was made of the blood-agglutination reactions in an infected herd over a period of years. Contrary to the expressed opinion of some workers, some animals showed a decreasing titre at the time of parturition or abortion. On examination of frequent agglutination tests on 63 positive cows, eleven were found to exhibit this phenomenon in some degree. Definite examples are submitted.

2. INCIDENCE OF ABORTION AND STERILITY

Data are presented compiled from the breeding records of 118 cows in a herd infected with Bang's disease. In this herd, 63 infected cows observed had a total of 208 pregnancies, 53 (25%) of which terminated in abortion. Thirty-two (50%) of the infected cows had a history of abortion from one to five times each. In this infected herd, 55 negative cows had a total of 173 pregnancies, 21 (11%) of which terminated in abortion.

In the Bang's disease-free herd, 276 cows had a total of 711 pregnancies, 49 (6.9%) of which terminated in abortion.

3. SIGNIFICANCE OF ALTERATIONS IN THE FETAL MEMBRANES

Over a period of years observations were made on over 1,000 fetal membranes of cows. Three types of abnormalities were noted commonly: accessory placental areas, naked areas on the chorion and necrosis.

Representative cases of each type are presented, illustrated by charts of the fetal membranes of successive pregnancies.

Brucellosis of Horses and Goats

W. S. STONE, D.V.M., M.S.

Blood samples from three groups of horses and random blood samples from goats were examined for Brucella agglutinins. A total of 1,741 horses and 419 goats were tested. Of the 1,169 samples obtained from New York city horses, 60 per cent were negative at 1:25 and only 26, or 2.22 per cent, showed a positive titre at a dilution of 1:100 or higher. Samples from 270 farm horses showed that 47 per cent were negative at 1:25 and that 10.74 per cent were positive at 1:100 or higher. Three hundred and two blood samples from horses in the surgical clinic of the New York State Veterinary College were tested. Forty-four per cent were negative at 1:25 and 37.41 per cent were positive at 1:100 or higher. Many of the clinic horses carried very high titres and 112 had either fistulous withers or poll evil. No cases of fistulous withers or poll evil were found in the city horses and only a few were found among the farm horses.

Ninety-four per cent of the goats tested were negative at 1:25; none of the goats tested had a positive titre at a dilution of 1:100. Only 18, or 4.29 per cent, of the 419 goats showed a positive titre at 1:25 and 1:50. Brucella was not isolated from any of the goats.

Results Obtained by Long-Continued Cultivation of Brucella Abortus in Chick Embryos

H. J. METZGER, D.V.M., and FREIDA R. STOKES, M.S.

In a previous paper it was reported that eleven egg-to-egg transfers of a virulent strain C. G. of *Brucella abortus* had not altered the cultural characteristics, virulence or antigenic properties of this strain. Beginning with the 39th transfer, this strain began to grow readily under aerobic conditions. Cultures isolated from all subsequent transfers up to the present (55th transfer) have grown without the addition of CO_2.

A comparison of the 48th transfer of this strain with the original strain C. G. by guinea pig inoculations indicates that the long-continued growth of this strain on chick-embryo tissue has caused it to lose much of its virulence as measured by lesions produced in the guinea pigs. It also indicates that it has reduced the ability of the organism to stimulate the production of a high agglutination titre in the guinea pig.

Studies on Genetic Resistance in Swine to Brucella Infection

H. S. CAMERON, D.V.M., M.S., Ph.D., E. H. HUGHES, B.S.A., M.A., Ph.D., and P. W. GREGORY, Sc.D.

During investigations on swine abortion, two grade sows and a grade boar possibly related were proved by repeated oral administrations of a virulent strain to be resistant, as judged by the agglutination test to infection with *Brucella suis*. In order to

investigate the possibility of a genetic factor's being involved, the two sows were mated to the boar and the progeny tested for resistance and susceptibility. Three gilts from this mating were bred back to their sire and their progeny also tested.

The method of testing consisted of an oral administration of a suspension of the organism at 13 weeks of age, blood testing being done three weeks later and monthly thereafter. A group of young pigs from another source constituted a control on the method of administration. Age resistance was eliminated by a second attempt to infect at an older age. The results indicated a high degree of resistance in the progeny from the selected matings.

To eliminate the possibility that the genetic factor being transmitted was an inability to produce agglutinins to, rather than a resistance to, *Br. suis,* a number of animals were autopsied and the organism sought. In all cases the findings were in accordance with the results of the agglutination test. The organism was in no instance found in the genital exudate at farrowing.

Nonspecific Hemoglobinuria and Acute Pulmonary Emphysema of Cattle as Essential Enterotoxemias

FRANK W. SCHOFIELD, V.S., B.V.Sc.

A brief description of nonspecific hemoglobinuria and acute pulmonary emphysema is given. The conditions under which they occur in this and other countries are considered and the reasons for regarding them as essentially related to enteric disorder are set forth. The work of other investigators is fully reviewed. The paper then describes the histopathological changes which occur, including the bacteriological findings.

A series of experiments designed to reproduce hemoglobinuria artificially is reviewed. Out of many experiments only two were successful—one a fatal and the other a nonfatal case. Aphosphorosis as a contributing factor is carefully considered. The unsuccessful search for hemolysins is recounted. Cases in calves, steers and other animals are recorded, proving that the disease is not always a post-parturient disorder. The conclusions are that our knowledge with regard to the etiology of both of these diseases is at present incomplete and that further experimental work along lines suggested should be undertaken.

The Pathology of the Bovine Kidney in Vitamin A Deficiency

R. F. LANGHAM, B.A., M.S., L. B. SHOLL, B.S., M.S., D.V.M., and E. T. HALLMAN, D.V.M.

Does a low supply of vitamin A have any effect on the bovine kidney? With this question in mind, the authors have studied 23 experimental cases in the hope of deriving some conclusions. The animals used for the study were obtained from the dairy section experimental herd of the Michigan Agricultural Experiment Station and can be divided into four groups, each giving a slightly different approach to the problem. Group I consisted of two calves which were born of low vitamin A mothers but succumbed from pneumonia by one month of age. Group II consisted of three animals, ranging in age from 3 months to 3 years, which died of pneumonia. Group III consisted of ten animals, ranging in age from 5 months to 7 years, which were brought down by vitamin A deficiency. Group IV consisted of eight animals ranging in age from 8 months to 2 years; these animals received some carotene periodically during the course of the experiment.

Male calves of the Holstein and Ayrshire breeds were used. After 40-90 days of age they received a low-carotene ration which consisted of skim milk and a concentrate mixture of 240 lb. of barley, 180 lb. of rolled oats, 180 lb. of wheat bran, 60 lb. of linseed oil meal and 8 lb. of salt. Previous to being placed on the ration, the calves received whole milk and the low-carotene concentrate ration.

The animals were autopsied shortly

after slaughter or death and the tissues placed in Zenker's fluid and formaldehyde. Staining was carried out by the usual method of procedure.

Grossly the kidneys varied somewhat in individual cases. The capsules were tense but stripped easily from the swollen cortex. The surface showed a moderate congestion with an occasional petechial hemorrhage. Some of the lobes were mottled due to scattered to numerous white pin-point foci. On section the cut surface bulged and the pin-point foci extended part way into the depth of the cortex while foci not visible from the surface could be seen. Edema of the kidney was present in a few of the cases. In one case the major and minor calices and the ureters were filled with a milky white fluid.

Microscopically the most conspicuous lesions were degenerative in character, such as cloudy swelling, fatty degeneration and necrosis. The proximal convoluted tubules showed the most extensive changes followed by the collecting tubules, distal convoluted tubules and Henle's loop. In several cases the necrosis was widespread but could not be attributed to postmortem changes. Some of the renal corpuscles showed some albuminuria and occasionally some hemorrhage.

The pin-point foci described in gross were characterized by focal accumulations of lymphocytes and macrophages or proliferation of fibroblasts and fibrosis. In these areas the tubules showed some atrophy and hyalinization. In one or two cases this peculiar hyalinization appeared to involve the basal third to half of the epithelium of the proximal convoluted tubules. In these areas the renal corpuscles showed thickening of Bowman's capsule with concentric rings of connective tissue; occasionally the basement membrane would be four or five times its usual thickness. Sometimes the glomerular tuft showed atrophy and hyalinization. Some of the cases showed metaplasia of the epithelium lining the minor calices.

Urinalysis on three of the above cases over a period of four to five months indicated a gradual decline in the pH from a normal of approximately 7.5 to 5.62 and a loss in specific gravity to 1.017. The urinary sediment contained occasional granular casts, pus and epithelial cells.

Studies on Thysanosoma Actinioides

F. X. GASSNER, D.V.M., and
FRANK THORP, JR., D.V.M., M.Sc., Ph.D.

Although the existence of the parasite, *Thysanosoma actinioides,* has been known for over a century, little information is present in the literature regarding its life cycle.

In examinations of lamb feces for parasite ova, only one embryonated egg case was found during 1939. In the small intestine of the lamb whose feces showed the egg case, fringed tapeworms were present at autopsy. In the contents of the large intestines, a few detached segments were found which contained embryonated egg cases. From then on, when this cestode was encountered in the small intestines of lambs, the contents of both intestines were separated and repeatedly washed and decanted. A few segments of the fringed tapeworm were recovered by this procedure from either the small or the large intestine, or from both. These segments contained the embryonated egg cases. The cases were not found in the terminal segments of entire worms taken from the small intestines. However, a critical examination of the uterine tract of the terminal segments of some worms revealed ova in various stages of development, but no embryonated egg cases.

The egg cases containing the ova are encapsulated forms with one end rounded, the other end terminating in a frayed, tail-like structure (neck of parauterine pouch).

Structurally the embryonated ova show the embryo within a single shell containing the hexacanth. Surrounding the embryo proper is a colorless corona-like structure which is of nonrefractile, transparent material.

Studies on Chick-Embryo-Propagated Equine Encephalomyelitis Virus and Vaccine: Antigenicity and Preservation

M. S. SHAHAN, D.V.M., and ERVIN A. EICHHORN, V.M.D.

Equine encephalomyelitis virus carried through 226 serial passages in chick embryos and confined strictly to this medium for propagation remained antigenically and pathogenically indistinguishable from the same strain of virus also transmitted through embryos but periodically interrupted by passage through the horse.

Desiccation by vacuum of rapidly frozen virus, rapid freezing alone and desiccation in vacuum by means of P_2O_5 have been tested as substitutes for buffeted glycerin solution in preserving virus. Desiccation by P_2O_5 appears to be the most permanent and otherwise effective means of preservation tried.

Rapid, complete drying *in vacuo* over P_2O_5 and storage under a high degree of vacuum in the refrigerator provided a uniformly infective virus for at least one year, the maximum period of storage tested.

Determination of Parentage in Cattle by Means of Cellular Antigens in the Blood

LLOYD C. FERGUSON, D.V.M., M.S., Ph.D.

More than 20 distinct antigens have been demonstrated in the erythrocytes of cattle by means of immune isolysins. Each of these cellular substances was recognized, presumably as a single character, by its reaction with a particular antiserum or specific reagent. In the immune sera containing a complex system of antibodies the reagents were prepared by absorption with the cells of certain cattle.

Tests made on the blood of more than 100 animals and their respective parents suggest that each of the antigens is individually controlled by a single gene. The cells of an animal contained a particular antigen only if one or both parents possessed it. Since no exception to this rule has been found, it is assumed that the presence of a particular character in the cells of a calf serves to exclude this individual as the offspring of parents both of whose cells lack this antigen. These methods are applicable in different types of cases, for example, when two or more calves are confused before being properly identified, when the sire is not definitely known because of multiple services, and when the validity of a registration is questioned.

Sulfapyridine in Cattle: a Contribution to Its Pharmacology

LOUIS A. KLEIN, V.M.D., Sc.D., ALBERT L. KLECKNER, Ph.D., and ROBERT O. BLITZ, V.M.D.

Sulfapyridine was administered in a drench to six cows in three experiments to determine the quantity that could be administered without producing toxic effects, the time required to attain a concentration in the blood adequate for therapeutic effect, and how frequently the drug would have to be administered to maintain this level with the least fluctuation.

The drug was given in daily doses of 4, 5, 6, 7, 8 and 9 Gm. per 100 lb. of body weight. The daily quantity was administered in fractional doses on various schedules and the concentration of free sulfapyridine in the blood, white and red cell counts, differential white cell count and hemoglobin determined.

On a daily dose of 4 Gm. per 100 lb. of body weight for 48 hours a blood concentration of free sulfapyridine within the level of 3 to 6 mg. per 100 cc. of blood, the concentration found therapeutically effective for man, was attained in the individual cows in 12 to 34 hours after the initial dose was given. A maximum concentration of 3.6 to 4.2 mg. was attained in 32 to 44 hours.

When daily doses of 5 and 6 Gm. per 100 lb. of body weight were administered

for six days, the free sulfapyridine in the blood reached the 3- to 6-mg. level in 12 to 26 hours. The blood concentration continued to increase until the middle of the sixth day, when a maximum of 11.6 to 13 mg. was attained, indicating that the drug is accumulative.

On daily doses of 7, 8 and 9 Gm. per 100 lb. of body weight administered for six days, the 3- to 6-mg. blood level of free sulfapyridine was attained in 9 to 38 hours. The cow on the 9-Gm. dosage attained a maximum blood level of 14.4 mg. on the fifth day. The maximum of the cows on the 7- and 8-Gm. dosage was no higher than that of the cows on the 5- and 6-Gm. dosage but was attained one day earlier in the cow on the 8-Gm. dosage. The concentration of free sulfapyridine in the milk of the cows on the 7-, 8- and 9-Gm. dosage also was determined and was found to be 1.8, 1.2 and 3.7 mg. lower, respectively, than in the blood.

The various daily doses were administered in fractional doses on different schedules. The sulfapyridine blood level rose most rapidly the first day, when the daily dose was given in four fractions at intervals of four hours, but also had the greatest drop in the interval between the daily doses. There was less fluctuation of the sulfapyridine level when the daily dose was given in five fractions at four-hour intervals or in three fractions at intervals of eight hours.

Undesirable effects were observed in all of the cows from all of the doses administered. Loss of appetite, constipation and decrease in milk production occurred in all of them, but these conditions disappeared in a day or two after the last dose was given. One cow developed urticaria-like swellings in the skin, but these cleared up in the two days following the last dose. The temperature was not affected and no symptoms of urinary disturbance or other serious toxic effects reported in man were observed.

There was no effect on the red cells or hemoglobin content of the blood. The total white cell count increased in all but one cow. The percentage of lymphocytes decreased while the percentage of neutrophils increased.

Bacterial Dissociation in Brucella Abortus

CARROLL K. MINGLE, D.V.M., M.Sc., and CHESTER A. MANTHEI, D.V.M.

The phenomenon of dissociation in Brucella cultures appears to be one of a progressive nature, varying in the rapidity with which observable changes occur. Such modifying factors as the inherent stability of individual strains as well as environmental conditions surrounding their propagation are recognized. As the practical significance of bacterial instability would seem to lie primarily in its manifestations under usual laboratory procedure, the methods and materials employed in this study have conformed, in so far as practicable, with these conditions.

A broad classification of the colonial forms observed in strain 19 and commonly associated with most Brucella cultures consists of three groups: the S (smooth), I (intermediate) and R (rough) types.

The S type conforms to the general concept of smooth forms described for most bacterial species. The colonies are characteristically small, bluish and translucent, with regular margins and smooth, glistening surfaces. While this type is generally associated with virulent cultures, pathogenicity is not necessarily distinctive of the S form. This is readily apparent in the fact that repeated selective subcultures of smooth colonies invariably fail to materially increase the virulence of strain 19. Antigenically the S organisms are similar to those associated with virulent infections.

The R type, descriptive of terminal dissociative forms, although possessing some of the characteristics of this dissociant in other species, does present certain notable differences in Brucella cultures. The colonies, though usually larger than the S forms, tend to maintain a uniformly regular margin. In common with R colonies of other bacterial groups, those of Brucella

are markedly opaque and present a dull, granular appearance. In general, the convex surface associated with the S type is considerably less pronounced in the R form. This restricted elevation becomes progressively accentuated with increasing age of the culture. The individual cells are usually larger than those of the S colony and occasional long, slender rods may be observed. Instability of bacterial suspensions prepared in 0.85 per cent saline is characteristic of the R type. Distinct indifferences are also observed in the S and R forms from the standpoint of altered virulence, antigenicity and physiological activity.

Progressive variations in colonial appearance, occurring gradually in the S to R conversion, make for considerable difficulty in classification of the so-called I or intermediate type. This is further complicated by the fact that antigenic and physiological changes do not necessarily parallel detectable variations in colonial characteristics. The intermediate form is usually larger than either its S or R prototypes although this difference in size is less pronounced in a comparison of the I and R forms than of the I and S forms. Obviously, variants should and do exist which are intermediate between the S and I types as well as between the I and R types. These, however, are usually quite unstable and difficult to propagate in pure culture. In appearance, most I forms exhibit a moderate degree of granularity, while otherwise retaining the colonial and antigenic qualities peculiar to the smooth colonies. As conversion progresses from the I to the R stage, associated changes in antigenicity and virulence are usually noted.

A less frequently encountered dissociant has been observed in strain 19, which presents rather marked morphological differences as compared with the usual forms. As a result of preliminary studies carried out in connection with this variant, it has been tentatively classified as an intermediate type only slightly removed from the typical R form. The colonial appearance differs largely from the usual recognized types in that a characteristically contoured or wrinkled surface is apparent. The colonies exhibit granularity to a degree comparable with that observed in the usual intermediate forms.

In view of the decidedly different characters of this variant, it was only after reversion to forms typical in antigenic, morphological, and physiological properties had been induced that it was possible to establish the identity as Brucella. A study of the immunological properties of this type, as well as continued investigations along general lines of dissociation in Brucella, is in progress.

Field Experiments in Bang's Vaccination

MELVIN RABSTEIN, V.M.D., and MARK WELSH, B.S., D.V.M.

Seven hundred and ninety-six calves and heifers in eleven herds have been vaccinated with BAI strain 19 vaccine. The percentage of reactors in these herds varied from 6.5 to 100, with an average of 36.2.

The vaccinated animals have been divided into three age groups: 3 to 8 months, 9 to 12 months and 13 to 21 months. A comparison of the results shows that at the end of 18 months following vaccination in the first group (3 to 8 months) 4.82 per cent still show a blood titre, of which 1.4 per cent are positive and 3.42 per cent suspicious. In the second group (9 to 12 months) at the end of 18 months following vaccination, 28.09 per cent still showed titres, of which 6.74 per cent were positive and 21.35 per cent suspicious. In the third group (13 to 21 months) after the same length of time, 60 per cent still showed a titre, 20 per cent of which were positive and 40 per cent suspicious.

A record has been kept of 640 calvings which represent 172 cows having one calf, 90 cows having two calves, 48 cows having three calves, 26 cows having four calves and eight cows having five calves. Ten of these calvings, or 1.5 per cent, have terminated in abortions.

Quarter-milk samples from 77 vaccinated

animals have been tested by direct culture and guinea pig inoculation for the presence of *Brucella abortus*. The organisms have been isolated from five of the vaccinated animals. Three of these animals were vaccinated with a commercial vaccine in 1934 which was reported to contain virulent *Br. abortus* organisms and thereby might have been responsible for the localization in the udder. It may be assumed that the two remaining animals failed to respond to the immunization and contracted the infection during constant association with infected animals. In no instance did the isolated organisms possess the characteristics of strain 19.

The average percentage of reactors in the experimental herds (adult animals only) after 5½ years of calfhood vaccination has been reduced from 36.5 to 8. Three of the eleven herds are entirely free of reactors. The number of vaccinated animals now amounts to 48.9 per cent of the total in the adult herds.

Economics and Its Application to Hospital Therapy and Hygiene

CHARLES C. RIFE, D.V.M.

Veterinarians should be interested in economics as it applies to their hospitals and practices, by keeping some form of analysis book. The records I keep show that my operating expenses are approximately 50 per cent of my gross revenue.

In my experience, owning and operating a hospital will pay dividends far in excess of what could be earned from the same investment in good securities or rental property. The margin of profit will allow enough levity in methods of treatment and in procuring additional modern equipment, and expansion of the plant if necessary.

I believe that veterinary medical economics along with professional knowledge properly applied should satisfy all of your wants, both now and in old age, and give you the place that rightfully belongs to you as a professional man in your community.

The Value of Well-Planned Surgery

D. A. EASTMAN, D.V.M.

In attempting to place animal surgery on a plane with human surgery, there is a need for better standardization, simplification and planning than now exist. Human surgery has long been standardized and the technics of many operative procedures are taught and recognized the world over, by name. This is desirable in the surgery of animals, and instructors and practitioners should work toward this goal.

Thorough planning and simplification of surgery tend to produce speed without hurry. Speed is made possible by good planning; hurrying destroys its good effects. To my mind there is only one type of good surgery and that is simple surgery. Surgery is at its best when it is so simplified that it looks easy to the observer, be he trained or untrained in this field. Whenever possible, the surgeon should have someone, preferably the owner, watch the operation.

Preoperative planning must allow for the lowering of resistance that will accompany the operation and be so devised as to offset it. Steps should be taken to prevent surgical shock.

The Relationship Between the Small Animal Practitioner and His Clients

CLARENCE N. BRAMER, D.V.M.

The necessity of handling clients in such a way as to win good will is fundamental in the practice of medicine. Sometimes the first impression, perhaps but a telephone conversation, will pay one good dividends in the future. . . . A pleasant conversation, like good personal appearance, may be the starting point of a mutual benefit. . . . Clean hospital and reception room, free of objectionable odors, speak for themselves. . . . Record cards tabulating all that should be

known about owner and patient are essential in holding a permanent clientele. . . . The matters of demanding a deposit upon entering a patient and collecting accounts are questions of policy requiring systematic attention. . . .

Courtesy discounts to members of related professions are good investments. . . . And, courteous attention to all, regardless of their station, brings good returns. . . . Avoid arguments. . . . Assume that the "customer is always right." . . . Convince the skeptics that you are working for their interests. . . . Polite mention of price, especially to new clients, is sometimes necessary to avoid disputes. . . . Use diplomacy in giving reports on the progress of patients, avoiding reference to unfavorable trends to no good purpose, but promise to report promptly any sign of unsatisfactory progress. . . .

Discharge patients at the proper time—don't keep them too long and don't send them home too soon. . . . Check discharged patients by telephone, to show continued interest in the progress of the case and to suggest needed changes in treatment or additional measures. . . . Honesty and sincerity bring their reward. . . . Stretching the truth never pays when accidents occur. . . . Agree with clients who prefer to treat their animals at home rather than to insist on hospitalization. . . . Handle these by making visits and frequent telephone calls. . . . Treacherous animals are better off at home; they are apt to bite attendants or injure themselves by struggling. . . . Never speak lightly of any case; owners may have detected symptoms easily overlooked on casual inspection; a few hours may change the clinical picture and cause the owner to seek other opinions. . . . Courtesy examinations of a newly acquired pup is good strategy; it is the opportune moment to discuss diet and distemper prophylaxis. . . . Do not overemphasize the resort to x-ray or laboratory examinations merely because you are equipped to make them, but to neglect these when necessary is equally wrong. . . . Kennel owners are either problems or great aids, according to how they are handled. . . . The fine, dependable kennel owner is a great asset, just as the careless, unethical type is detrimental. . . . Establishing good relations with the better class of kennel owners is an important matter in small animal medicine.

The maintenance of harmonious relations between the junior and senior members of the hospital staff is discussed, especially in regard to conversations between them in the presence of clients.

The thorough examination, the bathing and grooming of dogs when discharged should never be omitted. . . . Painless euthanasia in the presence of owners can be made a credit to the profession. . . . Reporting a death should never be delayed, despite the fact that it is the most unpleasant duty of small animal practice. . . . The distress may sometimes be softened by finding a healthy replacement of the same breed.

Small Animal Dentistry

ALAN C. SECORD, V.S., B.V.Sc., M.Sc.

The purpose of this paper is to consider some of the accepted treatments and practices in small animal dentistry. The subject is treated entirely from a practitioner's viewpoint. A study of 10,000 case records shows that 12.76 per cent of all patients treated in the hospital required some dental attention. Education of clients as to the necessity of regular preventive dental treatment will pay good dividends in practice building. Stomach and digestive disorders, keratitis, rheumatism and obscure lameness may all result from focal infections of diseased teeth and gums.

The advisability of a general anesthetic for proper restraint is stressed in major dental operations. Ether, pentothal sodium, nembutal and a combination with a local anesthetic nerve block are all discussed.

Removal of tartar is best accomplished with an S76 incisor forceps, the handiest of all dental forceps. The calculus is cracked off the teeth by applying pressure between the slender jaws. One should look well up under the gum margins and all sides of the teeth for tartar deposits.

The amount of work and the methods necessary to extract teeth will vary considerably, depending upon the conditions present. The use of a dental elevator and molar splitter is featured for difficult extractions.

Incisor, premolar, molar and canine teeth are all discussed separately, with special emphasis on extraction of the upper fourth premolar, first lower molar and canine. Facial sinus is caused by an abscessed posterior root of the upper fourth premolar. Often on clinical examination the tooth does not appear to be diseased. The only successful treatment is to extract the tooth and establish bottom drainage.

When indicated, it is good practice to take x-rays to check the possibility of retained infected roots. A normal root is long and sharp pointed, an infected one is short and blunt.

Pyorrhea is characterized by deposits of calculus which extend up the root, causing the gums to recede. Infection invades the periosteum of the alveolus and the root atrophies, allowing the tooth to loosen in the socket. The treatment is to remove the calculus and extract all loose teeth. In severe cases it is advisable to remove all of the teeth, but this should be done over an extended period rather than in one major operation.

Vincent's gingivitis is caused by a spirochete and characterized by a particularly fetid odor and pain evidenced by resentment to a clinical examination. The treatment is silver nitrate cauterization and supportive antiseptic treatment. Severe cases require intravenous injections of arsenic along with nicotinic acid. Sometimes it is necessary to extract certain teeth.

Orthodontistry is the straightening of malposition of teeth by the use of bands and spring wires. In canine practice this is done with the aid of a human dental surgeon who specializes in this work. The veterinarian provides suitable restraint, the dentist makes the impressions and builds the correction bands. In picked cases it is possible to correct under- or overshot incisor teeth in valuable show dogs. Two cases are cited where cosmetic gold crowns were used successfully in repairing broken canines.

The Occurrence of Swine Erysipelas in the Human Family

GLENN S. EVERTS, M.D.

Swine erysipelas is caused by *Erysipelothrix rhusiopathiae*, a bacillus appearing either coccoid in shape or as a straight or slightly curved rod. It manifests marked resistance to the common processing of pork, such as boiling, salting, pickling and smoking. The skin disease of the human family which Rosenbach designated erysipeloid in 1884 is now known to be an infection caused by the same organism.

The bacillus of swine erysipelas is widely disseminated. It is found wherever nitrogenous substances are decomposing and in certain environments it exists in the soil as a saprophyte. Although the organism has been demonstrated in diseased cattle, sheep and birds, it is known that a much greater frequency of infection is found in swine. Some investigators believe that a large percentage of all swine are carriers of the organism without showing symptoms of the infection.

Three forms of this infection are found in swine: the mild form, diamond skin disease; the severe form, erysipelas septicemia; and the chronic form, chronic erysipelas and endocarditis with symptoms of polyarthritis. A prototype of each of these forms is recognized in man, but the latter two are rare.

In man the form which corresponds to the diamond skin disease in swine is not uncommon. In two of the past several years the incidence of erysipeloid reached 2 per cent of the employés exposed to the handling of pork products in a packing plant. This form of the disease appears at the site of any minute break in the skin, usually on the hands. The first symptom is pain at the site of inoculation followed by

swelling and erythema. The two most valuable diagnostic criteria are the murky, purplish red erythema of the part and pain out of proportion to the appearance of the lesion, especially when near a joint. The infection proceeds characteristically to show migratory tendencies. It usually spreads by continuity, but many cases show the purplish red patches developing at points several inches removed from the larger body of the infection. Except in severe cases it seldom extends above the wrist. There is no pitting on pressure, and no suppuration.

Inasmuch as erysipeloid is nearly always preceded by an easily demonstrable break in the skin, most persons thus affected in the packing industry become compensation cases, and hence of particular importance to the industrial physician. From onset to complete recovery the duration of the infection usually is about three weeks. In a plant where medical control is present, lost time may arise for two reasons: The affected part hurts too much for the employé to continue working or the progress of the infection is so rapid as to suggest unusual virulency and consequent need for frequent local treatment. About one fourth of the cases lose time ranging from one day to two weeks.

As to treatment, rest and heat are important. The hand should be carried in a sling. All varieties of antiseptics and other agents have been recommended. Many cases clear up by applying ichthammol on the affected part and bandaging it snugly in order to partially splint it while the patient continues to work. This is followed by advising two half-hour soakings in hot Epsom salt solution in the evening, with a wet dressing of 12 per cent ichthammol in alcohol during the night. Erythema doses of ultraviolet rays with a water-cooled mercury quartz lamp apparently have been effective in acute cases. Although serum sickness must be kept in mind, the use of immune serum has been advocated if the infection persists a month or more.

The incidence of erysipeloid in one pork-packing plant has decreased during the past three years. However, this is no proof that the infection is decreasing generally because several indeterminate factors are involved.

The Sectional Incidence of Swine Erysipelas in the United States

W. T. SPENCER, D.V.S.

Reports from packers at Omaha in the early spring of 1938 concerning increased losses of hogs from condemnations on account of arthritis prompted an investigation as to the extent of this condition in other sections of the Corn Belt. Correspondence with packer managers indicated that there was considerable loss at other points from arthritis condemnations and that such losses had definitely increased during the past few years. E. S. Dickey, veterinarian for the John Morrell packing company at Ottumwa, Iowa, made a limited survey in the fall of 1938 covering ten packing plants within a radius of 400 miles of Ottumwa. The information gathered by Dr. Dickey indicated that as high as 2 per cent of all hogs slaughtered at one plant in November 1938 were affected with arthritis. A check of the reports of the federal bureau of animal industry covering the years indicated in the table below showed the following results of hogs slaughtered and the number condemned on account of arthritis and similar diseases:

Year	*Total Kill*	*Carcasses Condemned*	*Per Cent*
1919	44,398,389	59	.0001
1926	40,442,730	331	.0008
1928	48,347,393	6,297	.013
1933	45,698,053	9,183	.020
1938	32,453,905	6,896	.021

It is generally accepted that a very large percentage of swine arthritis is the result of swine-erysipelas infection.

The pathological division of the federal bureau of animal industry has conducted numerous tests of affected hog joints secured from packing plants at Denver, Sioux City and Sioux Falls. C. L. Davis of the bureau's pathological laboratory at Denver, Colo., reported that out of 168 hog specimens of arthritis joints examined be-

tween February 1 and June 26, 1939, 156 gave positive agglutination tests to swine erysipelas.

The bureau's meat inspection division conducted a special investigation at all U. S. inspected plants covering a 20-day period beginning June 26 and ending July 15, 1939, to determine the number and percentage of hogs affected with arthritis and, in a general way, the geographical location and the points of origin. The report showed that 855,503 hogs were slaughtered in Illinois, Iowa, Kansas, Missouri and Nebraska, most of them originating in these states. Of this number, 4,368, or .51 per cent, were retained on account of arthritis and similar conditions. The hogs from this section showed the highest percentage of retentions on account of arthritis.

A questionnaire directed to all of the state veterinarians as to whether swine erysipelas was present in their respective states brought replies from 41; of these, 33 reported that the infection had been diagnosed in their state, 15 of them reporting extensive infection, namely: Arkansas, Georgia, Illinois, Indiana, Idaho, Iowa, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, New Mexico and Texas. These reports show swine erysipelas to be rather widely distributed in the important swine-producing states of Iowa, Nebraska, Illinois, Minnesota, South Dakota and Missouri and in the southern states of Arkansas, Oklahoma, Texas and Georgia, which have in recent years become quite important in swine production.

Swine Erysipelas, the Agglutination Test for Its Diagnosis, and a Report on a Study of Arthritis in Swine

C. G. GREY, D.V.M., O. L. OSTEEN, D.V.M., and H. W. SCHOENING, V.M.D.

A description is given of the preparation of the antigen for the plate agglutination test for swine erysipelas. An interpretation of the test and its limitations are discussed.

Of 472 arthritic joints from swine which were examined bacteriologically, 357, or 75.6 per cent, yielded *Erysipelothrix rhusiopathiae*. These specimens originated in 91 counties in 14 states.

The Bacterial Content of Goat Milk

C. S. BRYAN, B.S., M.S., Ph.D.

To date 380 goats in 15 herds of different sizes were used in this study. The smallest herd was one goat and the largest, 138 milking goats. Samples of milk (composite as well as separate samples from each half) were aseptically collected from each animal and iced while in transit to the laboratory. Laboratory tests employed in judging this milk were chloride and pH determinations and leucocyte counts. The tests to determine the bacteriological quality of the milk were standard plate count, resazurin and methylene-blue reduction test. The mastitis tests used were the microscopic test (properly collected milk samples incubated at 37° C. for 12 to 15 hours, then checked under the microscope) and blood-agar (tryptose-blood agar) culture.

Of the 380 goats checked, nine, or 2.3 per cent, had streptococcic mastitis; five, or 1.3 per cent, had staphylococcic mastitis; two, or 0.5 per cent, had noninfectious mastitis; and 364, or 95.9 per cent, had neither infectious nor noninfectious mastitis.

Of the noninfected animals 97.5 per cent gave a milk of class I methylene blue quality, 94 per cent gave a milk of class I resazurin quality, and only 4 per cent had a bacteria count of over 1,000. As to those with staphylococcic mastitis, 56 per cent gave a class I methylene blue milk, 40 per cent a class I resazurin milk, and 12 per cent had a bacteria count of more than 1,000. The quality of milk produced by the goats with streptococcic mastitis was greatly reduced, for only 40 per cent gave a class I methylene blue milk, 37 per cent a class I resazurin milk, and 50 per cent yielded milk with a bacteria count of over 1,000. The length of the lactation period, the age of the goat and the number of pre-

vious lactation periods did not influence the data.

If .16 per cent and less chloride in milk is considered as normal, we find that 5 per cent of the goats with no udder infection had an abnormal amount of chloride in their milk, whereas none of those with staphylococcic mastitis yielded milk with a high chloride content, but the milk of 30 per cent of those with streptococcic mastitis had a high chloride content. Five per cent of those with no udder infection were positive to the thybromol test (pH); 40 per cent of those with staphylococcic mastitis and 30 per cent of those with streptococcic mastitis reacted to the thybromol test. The normal lecuocyte content of milk was taken as one million and less per cubic centimeter of milk. On this basis 5 per cent of those with no udder infection, 50 per cent of those with staphylococcic mastitis, and 50 per cent of those with streptococcic mastitis had a high leucocyte count.

Requisites for a Practical Intracutaneous Test for the Detection of Trichina Infection in Swine

BENJAMIN SCHWARTZ, Ph.D.

A skin test for the diagnosis of trichinosis in swine would have to be sufficiently sensitive to detect infections with trichinae of various intensities in all or nearly all infected hogs and to elicit no reactions in uninfected hogs. In all positive cases the reactions would have to be distinct enough to be readily recognizable by inspectors engaged in meat inspection. The reacting skin areas would have to stand out in sharp contrast not only to the intact, normal skin, but also to the skin that is wrinkled, discolored, bruised, abraded or otherwise abnormal in appearance. The skins of hogs that come to slaughter frequently show blemishes of various sorts which easily could be confused with the reaction produced by the injection of trichina antigen. The occurrence of doubtful or positive reactions in nontrichinous hogs has been observed in the course of experimental work conducted in the U. S. bureau of animal industry; such reactions constitute a great drawback to the use of the skin test for diagnostic purposes. The available evidence indicates that the skin test, as developed at the present time, would not detect all trichina-infected hogs and would give positive reactions in a fairly large percentage of uninfected hogs.

Studies on the Control of Liver Flukes of Cattle in the Hawaiian Islands

J. E. ALICATA, B.A., M.A., Ph.D.

Liver-fluke infection represents one of the major diseases of beef and dairy cattle in the Hawaiian Islands. It has been estimated that about 50 per cent of the beef and 80 per cent of the dairy cattle are infected with flukes.

The maintenance of fluke infection in the territory has been due largely to ideal climatic conditions, poorly drained lowland areas, and the practice of feeding vegetation cut from swampy areas.

The problem of controlling the liver fluke of cattle in the Hawaiian Islands is being attacked from three standpoints: controlling the fresh-water snails (= *Fossaria ollula*), which serve as intermediate hosts; protecting the animals from infection; and anthelmintic treatment of infected animals.

Fresh-water snails may be controlled by the established methods of applying copper sulfate in infested areas and drainage. In addition, fireflies have been advocated by the writer as a possible biological means of controlling the snails; the larvae of these insects are carnivorous and utilize fresh-water snails and other soft-bodied invertebrates as food. The Territorial Board of Commissioners of Agriculture and Forestry has introduced fireflies (Luciola spp.) into the Islands from Japan and the Philippines. These insects are now being reared and are being liberated in suitable localities. Whether or not they will become established remains to be determined.

To protect animals from infection, it is recommended that infected areas be fenced off and that the animals should not be fed

vegetation cut from these regions. The writer also has suggested ensilage as a possible means of destroying the encysted flukes (= metacercariae) on vegetation. This suggestion is based on preliminary experiments; additional experiments along these lines will be necessary, however, before definite conclusions can be drawn.

Several preparations seem to be suitable for the destruction of flukes in cattle. Distol, a proprietary drug, has been found highly effective and is well tolerated by the animals. Satisfactory results have been obtained with distol at the rate of one capsule to 70 lb. of body weight, the total amount divided into equal or approximately equal dosages and administered over a period of two successive days. Kamala also has been found effective when administered at the rate of one capsule (10 Gm.) to each 60 lb. of body weight over a four-day period. The latter drug, however, has been found to cause extensive diarrhea and loss of appetite lasting for a few days to about two weeks.

Hexachloroethane also appears to be effective, but it has been found to cause colic when given at high concentrations. The writer has found this drug to be well tolerated and highly effective when mixed with kamala extract and given at the rate of one capsule (10 Gm. of hexachloroethane and 1.75 Gm. of kamala extract) to each 70 lb. of body weight over two successive days. Twenty-six cows have been treated successfully with this new preparation.

Most of the animals which have been treated with distol, kamala, or hexachloroethane and kamala extract combined, have improved in general physical condition. A few of the lactating cows treated have shown a slight decrease in milk production following treatment, lasting from one to two weeks.

An egg-count method has been described for determining the fluke-egg output per gram of feces of fluke-infected cattle. The efficacy of the various drugs has been established by making counts before and after anthelmintic treatment. In addition, a study has been made of the relationship between the number of eggs per gram of feces in ten fluky animals and the number of flukes harbored by them when slaughtered a few days later. The average number of eggs per gram of feces was 1.013 per adult fluke. Calculation of the regression coefficient with its standard error demonstrated that this relationship is highly significant. On this basis it is possible to estimate the approximate number of adult flukes harbored by an infected animal.

Epidemiology and Veterinary Aid in Epidemics

FRED W. GRAVES, D.V.M.

New York City has a population of 7 million concentrated in one large metropolitan area where all milk except a small amount of certified is pasteurized, yet no cases of milk-borne infection occurred during 1939. All of the cases I am reporting as occurring during 1939 were in upstate New York and in small communities where milk and cream was sold in its raw state.

As a veterinarian desiring to coöperate with your local health officers and to promote a more healthy and prosperous community, it is your duty as well as your obligation to help make the most of the tremendous opportunity for veterinarians in the field of epidemiology and public health.

The Nutritional Deficiency Diseases of Chickens

L. C. NORRIS, B.S., Ph.D.

The known nutritional deficiency diseases of chickens are the result of a lack of vitamins or essential mineral elements. No characteristic symptoms have been recognized which result from a lack of amino acids, free fatty acids or carbohydrates. Polyneuritis (vitamin B or thiamin deficiency), dermatosis (pantothenic acid deficiency), hemorrhagic disease (vitamin K deficiency) and hyperplastic goiter (iodine deficiency) appear to be largely of scientific interest. On the other hand, xerophthalmia (vitamin A deficiency), rickets

(vitamin D deficiency), nutritional encephalomalacia (probably vitamin E or alpha-tocopherol deficiency), nutritional leg paralysis (vitamin G or riboflavin deficiency), gizzard erosion (deficiency of the anti-gizzard-erosion factor) and perosis (chiefly manganese deficiency) are of considerable practical importance. The characteristic symptoms of these diseases are presented by means of illustrations and discussed. The importance of possessing some knowledge of the nutritional deficiency diseases of chickens in veterinary practice, and of poultry nutrition in general, is also discussed.

The Practitioner's Rôle in Poultry-Parasite Control

CHARLES B. CAIN, B.S., M.S., D.V.M.

This paper considers the control of poultry parasites in terms of the facility or difficulty of approach as compared with parasitism in other species of domestic animals.

Whereas in most species of animals the extent of parasite-control effort is governed by the economic value of the individual animal, in poultry the problem concerns an entire flock, or even a group of flocks. It is perhaps this fact that accounts for the failure of many veterinarians to find footing in this field. Because as a rule they have developed their skill only with respect to individual application and have not recognized the group problem of poultry, persons outside of the profession have been able to take over the health management of this industry.

Since the causative agents of infectious diseases multiply within the bird's body, they are likely to produce recognizable symptoms more rapidly than parasitic diseases. As a result, less attention may be given to parasitic diseases than they warrant.

The reactions produced by infections lead to the formation of immune substances sufficient to bring about recovery in a high percentage of the cases, whereas some parasites extend their ravages over a long period without apparent increased resistance on the part of the host. For this reason it is harder for the poultryman to estimate losses which come directly and indirectly from parasitism. On the other hand, the uncertainty of being able to rid poultry and premises completely of parasites makes them a perpetual problem of considerable economic importance and forces attention to control measures rather than to cures.

Preventing Poultry Diseases by Management

E. S. WEISNER, B.S., M.S., D.V.M.

Preventing disease in poultry flocks begins before the chicks are purchased or received for brooding. Much trouble can be avoided by giving some thought to the source of chicks. The factors to consider should include the closed flock, breeding for disease resistance and other genetic principles. The success of a poultry flock is dependent upon the hatcheryman's awareness of disease and his disease-control program. Purchasing chicks on price alone is poor assurance of a successful poultry enterprise.

Many poultry raisers contribute to heavy death losses in their flocks by failing to provide sanitation, light and ventilation.

Too few poultry raisers provide for the growth of the chicks, with the result that housing and feeder space become inadequate. Water, the cheapest of all feeds, is often meagerly supplied. The substitution of cheaper or deficient rations to range stock predisposes the birds to disease.

The success of a poultry flock is proportionate to the disease alertness of the caretakers. Inability to recognize the early symptoms of diseases or failure to secure an accurate diagnosis may be disastrous.

Promiscuous medication and overmedication are definitely faulty management practices. Included among these are the use of tonics, conditioners, coccidiosis preventives, many worm remedies, complicated mineral and vitamin concoctions and the

unwarranted use of some biological products.

The use of recognized tests for determining the presence of disease or to detect carriers of disease is a part of sound poultry management. Other specific disease-preventive measures, such as fowlpox and laryngotracheitis vaccination, also must be classed as management practices.

Paratyphoid Studies in Turkeys

R. FENSTERMACHER, D.V.M., and
B. S. POMEROY, D.V.M., M.S.

During the past five years 136 cultures of Salmonella-type organisms have been isolated from poults originating from 44 farms. These have been typed and identified by P. R. Edwards and D. Bruner. Twenty types of Salmonella were identified. *Salmonella pullorum* and *Shigella gallinarum* were also in the group.

Two groups of turkeys that were negative to serological tests with *S. pullorum* and *S. typhi-murium* antigens were used. Eggs produced by these birds were smeared with sterile feces that had been inoculated with a beef-infusion-broth culture of *S. typhi-murium*. One third of the egg surface was smeared lightly. The eggs were incubated and candled at regular intervals. Infertile eggs and those containing dead embryos were removed on the 14th, 21st and 28th days of incubation. The contents of the infertile eggs and the dead embryos were examined bacteriologically. Suspected colonies of *S. typhi-murium* were isolated and identified. Poults which hatched were reared on hardware wire. The internal organs of those which died were examined bacteriologically.

From pen I, 171 eggs were incubated. *S. typhi-murium* was recovered from 5.87 per cent of the 51 infertile eggs. The organism was recovered from 16.66 per cent of the 36 embryos examined at the end of the second week of incubation. Fifteen embryos dead at the end of the third week of incubation were examined, and 20 per cent of these harbored *S. typhi-murium*. Twenty-six embryos were dead at the end of the 28th day of incubation, and from 15.4 per cent of these the organism was recovered. Not all infertile eggs and eggs containing dead embryos were examined when found as such. Twenty-eight of these were examined on the 28th day of incubation, and from 32.14 per cent of them *S. typhi-murium* was recovered. Fifteen poults hatched and eleven died within 24 to 48 hours. The pathogen was recovered from the internal organs of each dead bird.

From pen II, 116 eggs were incubated. There were 56 infertile eggs and 3.57 per cent contained *S. typhi-murium*. Of the 18 embryos dead at the end of the second week of incubation 27.77 per cent contained the pathogen. Of the 19 embryos dead at the end of the third week of incubation 26.31 per cent contained the pathogen. Fifteen eggs contained dead embryos on the 28th day, and 46.66 per cent of these contained *S. typhi-murium*. Eight poults were hatched, and all died within 48 hours; all were harboring the pathogen. Negative results were obtained with the control eggs.

In another part of the study, eggs were incubated for 14 days. Infertile eggs and those containing dead embryos were discarded. The eggs containing living embryos were then inoculated in the air cell with 0.01 cc. of a saline suspension of *S. typhi-murium*. The controls were inoculated with sterile salt solution. Forty-five embryos were inoculated. Four poults were hatched. *S. typhi-murium* was recovered from all embryos and poults. Fifteen embryos were inoculated with normal saline. Seven of these hatched. Bacteriological examination of these gave negative results.

Turkey eggs were obtained from a privately owned flock which had been tested by the test-tube method with the two aforementioned antigens. The first set of 100 eggs was obtained in March and the second in May. Each set was divided into three groups. Fifty eggs were inoculated in the air cell with 0.03 cc. of a saline suspension of a 24-hour culture of *S. typhi-murium*. Twenty-five eggs were inoculated with a like amount of sterile saline solution, and 25 eggs that were not inoculated served as controls. Four per cent of the first group

of eggs inoculated with *S. typhi-murium* hatched. Only 2 per cent of the second group hatched. From groups 3 and 4 inoculated with normal salt solution 40 per cent of the former and 48 per cent of the latter group hatched. Groups 5 and 6 served as controls. Sixty-eight per cent of the former and 44 per cent of the latter group hatched.

Twenty-four infertile eggs at the end of the first week of incubation were inoculated in the air cell with 0.25 cc. of a 24-hour broth culture of *S. typhi-murium*. The eggs were kept in an incubator continually. At monthly intervals two of the eggs were examined bacteriologically. *S. typhi-murium* was recovered at each monthly examination except from those examined at the twelfth month. The last eggs were examined at the end of the 13th month and contained the organism.

Findings in Fowl Paralysis (Leucosis Complex)

NORMAN N. NELSON, D.V.M., M.S.

The diagnosis of the fowl-paralysis complex (leucosis complex) by the practitioner is often limited to gross pathology. In this brief discussion natural color photographs of a wide variety of gross lesions will be shown.

Lymphomatosis is understood to represent an excessive perivascular proliferation of primitive lymphoid tissues in almost any part of the body, especially in the visceral organs, nerve trunks and plexuses and eyes. Occasionally the blood may show lymphoblasts.

Leucosis is considered a vascular disease. The blood picture is high in primitive and immature forms of erythroblasts and/or myeloblasts. The gross lesions may be similar to visceral lymphomatosis.

These neoplastic-like conditions may shorten the life of the host directly by functional disturbance or indirectly by incapacitation of locomotion and apprehension of feed and water.

Osteopetrosis may be associated with lymphomatosis. Mixed abdominal neoplasms, as well as sarcomas, have been observed in flocks affected with the avian leucosis complex; the etiological relationship of such tumors to the avian leucosis complex remains to be clarified.

Inheritance as a Factor in Poultry-Pathology Research

C. A. BRANDLY, D.V.M., M.S., and N. F. WATERS, D.Sc.

The modern concept of disease recognizes the interdependence of three variable factors: the inherited capacity of the host, the character of the disease-producing agent and the environment which may materially influence the relationship between the host and the pathogen.

Mendel in 1865 pointed out that certain characters of the garden pea are inherited on a unit basis. His paper was the foundation for the science of genetics and our knowledge of the physical basis of inheritance.

Biffen's work (1905) on resistance to mycotic stem rust in wheat demonstrated the importance of heredity in relation to infectious disease in higher plants. While work with plants developed rapidly, study and progress in the same direction with animals were limited largely because of practical and intrinsic difficulties. Advantages offered by plants, such as self-fertilization, large numbers requiring limited facilities and shorter generation time, are not available to workers in the animal field.

Recent research into the genetics of disease resistance and susceptibility in animals has inquired into the mode and mechanism of such inheritance and the relative influence of the environment. Some of the findings demonstrate the presence of genetic differences in susceptibility among and within families of breeds and varieties. They clarify somewhat the physical mechanisms by which certain inherent characteristics become operative. Aside from environmental considerations it becomes obvious that the research worker in poultry diseases is faced with the necessity of appraising the factors of constitution of the

host and the disease-inducing agent and, therefore, should strive for experimental material with a known genetic background.

The Pathology of So-Called Pullet Disease or Blue Comb

ERWIN JUNGHERR, D.V.M., Ph.D.

This report is concerned with an epizoötiological, pathological and experimental study of a syndrome of young laying birds occurring primarily in the North Atlantic and North Central States during the warm season; it is popularly known as blue comb, summer housing, unknown, X, XX, and cholera-like disease, or contagious indigestion. According to the data collected by the author from 1931 to 1939, the disease reveals great variability with respect to symptomatological and pathological features; by microscopic examination of tissues certain common features can be determined which permit us to regard the disease as an essential entity. Attempts to subdivide the syndrome complex are not well founded at the present time.

The disease occurs usually soon after housing, but may be observed on range. It affected, on the average, 21.7 per cent of the flock, with an average mortality of 5.2 per cent. The symptoms consist of drop in egg production, droopiness, cyanosis, dehydration, diarrhea or constipation, and occasionally pyrexia. Pathologically the condition is characterized by focal necrosis of the liver, serosal petechiae, enlargement and apparent injury of the pancreatic islands, patchy muscular dystrophy, and nephrotic changes in the glomeruli and tubuli of the kidneys. The quantitative changes in the blood constituents suggest uremia. Experimental production of renal gout in birds by injection of small doses of potassium dichromate is associated with cyanosis and microscopic liver and muscle lesions, a picture not unlike that of the spontaneous syndrome. Pullet disease is considered to resemble the endogenous toxemias in other animals, and to represent essentially an uremic condition, the underlying causes of which must be studied further.

Swine Erysipelas in Turkeys

E. M. DICKINSON, D.V.M., M.Sc. and A. S. ROSENWALD, B.Sc., D.V.M.

Data on swine-erysipelas infection in 16 flocks of immature turkeys of various ages indicate that the epizoötiology of the disease in turkeys is highly variable and erratic. These outbreaks have been observed over a period of 2½ years and involve about 30,000 turkeys. The features observed most constantly were that all outbreaks occurred in the fall and winter months and that the affected birds were predominantly males. Data on morbidity, mortality, transmission, duration of the outbreaks and the effect of management are discussed.

Bacteriological studies of *Erysipelothrix rhusiopathiae* from turkeys and gross pathological changes produced by this infection are discussed. The use of these factors in the diagnosis of the disease is explained.

Satisfactory results were not obtained from the use of anti-swine-erysipelas serum on sick birds under controlled field conditions and on birds under laboratory conditions.

The Transmission of Fowl Leucosis Through Chick Embryos and Young Chicks

WALTER J. HALL, D.V.M.

During the past two years work has been carried on in artificial transmission of fowl leucosis in an attempt to develop a virus of uniform potency by rapid serial passages of leucotic blood through young chicks and chick embryos. After 16 passages through young chicks, the incubation period has been reduced from an average of 91 days for the first five passages to an average of 35 days for the last five passages reported upon, while the percentage of takes has

increased from an average of 64 per cent for the first five passages to an average of 93 per cent for the last five passages.

In an effort to enhance still further the potency of the virus, an attempt was made to propagate it on chick embryos. Over a period of three months several hundred embryonated eggs were inoculated with leucotic blood by the intravenous, chorio-allantoic and yolk-sac routes. The intravenous technic was the method of choice. Infection of the embryo was indicated by the appearance of numerous hemocytoblasts in the blood and the diagnosis was confirmed in each case by inoculation of this embryo blood into susceptible chicks. These chicks developed leucosis in about the same period of time as those inoculated with leucotic chick blood.

Of the first-passage embryos inoculated with leucotic blood, 3.5 per cent came down with leucosis and a few second-passage embryos developed leucosis as a result of the virus inoculation.

Transmission Experiments with Iritis of Fowls

C. D. LEE, M.S., D.V.M.

The term iritis is used to designate one type of the range-paralysis complex.

Eighty per cent of the chicks hatched from dams and sires affected with iritis and raised in isolation died from some form of the range-paralysis complex during a 14-month period. Approximately 70 per cent of the chicks hatched from normal males and iritis females died of some form of the range-paralysis complex in a 14-month period. Only 15 per cent of the birds hatched from iritis males and normal females died of the fowl-paralysis complex.

Twenty per cent of the chicks inoculated with ovarian tissue of an iritis fowl succumbed to some form of fowl paralysis. Approximately 50 per cent of the chicks inoculated with blood of a 13-month-old hen suffering from iritis became affected. Only one bird became affected with range paralysis when inoculated with testicular tissue from an iritis male. Forty per cent of the birds inoculated with blood of the iritis male became affected.

The infective agent was found present in day-old chicks hatched from iritis matings.

These experiments indicate that iritis males and females are possible carriers of fowl paralysis and the disease is transmitted to their offspring. This may account for many field outbreaks.

The results tend to show unity of etiology of erythroleucosis, myeloid leucosis, lymphocytoma, iritis and neurolymphomatosis gallinarum.

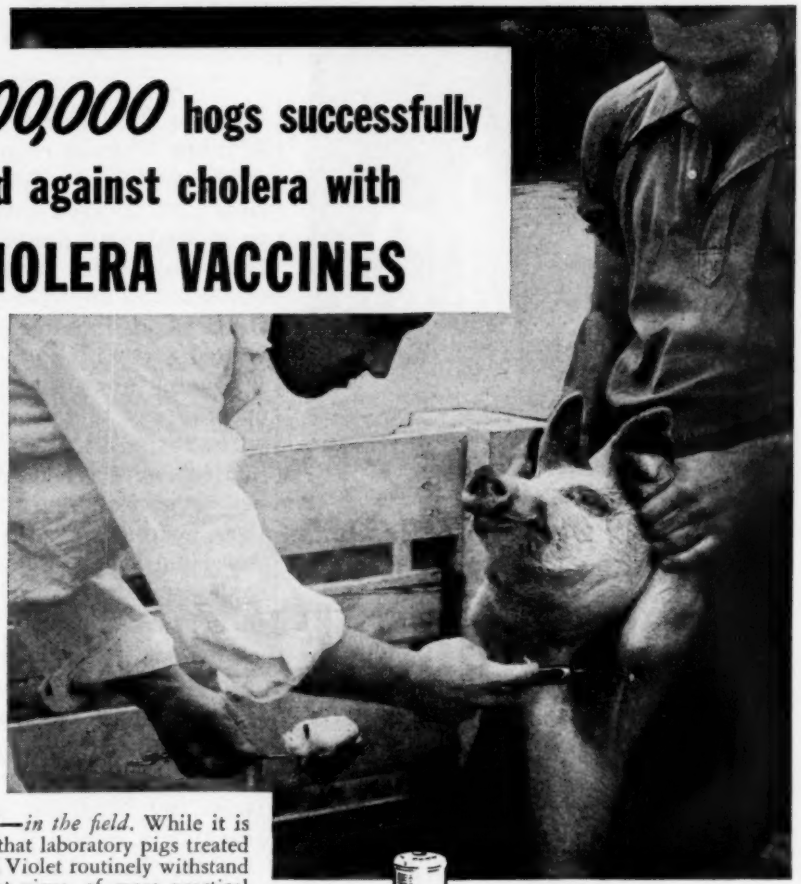
A Comparative Study of Pullorum Disease in Barred Plymouth Rock and New Hampshire Red Chickens

E. P. JOHNSON, D.V.M., M.S., Ph.D.

In a comparative study of the susceptibility of Barred Plymouth Rock and New Hampshire Red chickens to pullorum disease it was found that 99 Barred Plymouth Rock chicks out of 100 and 98 New Hampshire Red chicks out of 99 could be raised until 8 weeks of age and that all were free from pullorum disease as indicated by a negative reaction to the standard tube agglutination test at the age of 5 months.

Exposure to pullorum infection at the age of 5 months by placing two positive reacting chickens in a group of 22 Barred Plymouth Rock pullets and a group of 24 New Hampshire Red pullets, and by placing two 30-cc. (1-oz.) portions of a 24-hour broth culture of *Salmonella pullorum* in the drinking water used by these birds over a period of about two weeks, resulted in infection, according to the results of periodic agglutination tests on the serums of these birds until they were past 14 months of age, as follows: Only 2 out of 22 Barred Plymouth Rock birds became infected while 10 out of 24 New Hampshire Red birds became infected. This difference in susceptibility of the two breeds to pullorum disease was found to be statistically significant.

Over 100,000 hogs successfully immunized against cholera with HOG CHOLERA VACCINES



THEY'RE "working"—*in the field*. While it is interesting to know that laboratory pigs treated with B. T. V. and Crystal Violet routinely withstand later injections of potent virus, of more practical interest to you is the fact that more than 100,000 pigs vaccinated to date have withstood field infection following their use.

Like serum-virus, these vaccines produce a solid immunity against hog cholera; but *unlike* serum-virus there are no "vaccination breaks," nor period of stunting due to animals being off their feed following immunization. Instead, there has been a marked reduction in losses from secondary infections such as pneumonia and enteritis; and, because there is no let-up on feeding, pigs usually reach the market well ahead of serum-virus treated animals.

Your clients will appreciate the opportunity to market that proportion of their pigs which sometimes fail to survive the usual immunization procedure.

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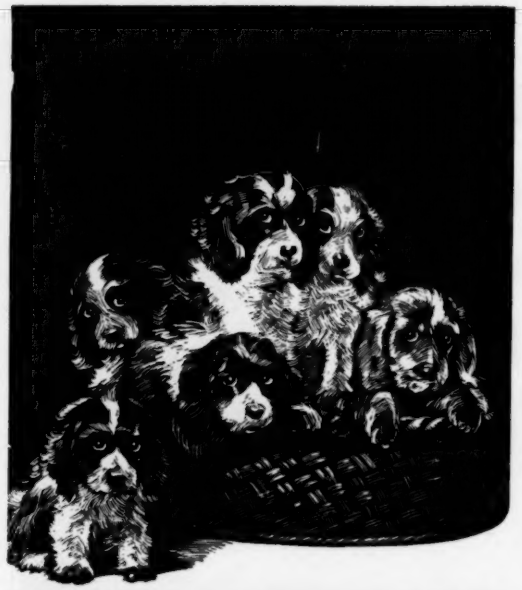

BREEDING POWER RESTORED in IMPOTENT DOGS

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(Testicular Hormonal Substance)

A sizable number of reports cite the restoration of copulatory powers in sexually impotent male humans and experimental animals after administration of PERANDREN. Very recently, clinical investigators injected PERANDREN, "Ciba," the synthetic, chemically pure ester of the powerful male sex hormone, into selected impotent dogs. Results were consistently successful. Tying occurred within 24 to 48 hours, with consequent fine whelps. PERANDREN may be expected to produce similar results in animals smaller or larger than dogs.

LITERATURE UPON REQUEST

*Trade Mark Reg. U. S. Pat. Off. Word "Perandren" identifies the product as testosterone propionate of Ciba's manufacture. Available through usual trade channels.

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Animals That Make the News

"Pass the Duck, Please!"

A TENSE SILENCE reigned on every marsh, swamp and lake at one minute before sunrise. As if at a given signal, eyes left watch dials and *Bang! Bang!* reverberated from every side. Thus the 1940 duck season was officially opened, at sunrise on October 16, in the Intermediate Zone of the United States.

Several unusual incidents occurred on opening day this year because it coincided with registration for the draft. Many hunters were reluctant to miss the shooting on such an important day, and phone lines were swamped with inquiries. They were told that if they were not sure they could register near the hunting grounds, they had better stay home. One hunter caused quite a flurry at the Le Moyne school in Chicago when he arrived carrying his shotgun. He registered, then went hunting.

To the sportsman, teal, mallard, canvasback and ringneck are nostalgic words bringing a mental picture of a bag loaded with the limit of ten, or a mournful remembrance of a freezing wait in a penetrating rainstorm with only the crackle of the marsh grass for excitement, and not a duck in sight.

The sports "Bible" is the United States Game Laws, and no true sportsman will infringe upon them. All persons over 16 years of age hunting migratory waterfowl are required to have with them an unexpired Federal Migratory Bird Hunting Stamp, validated by signature on the stamp. Commonly called a duck stamp, this may be purchased at post offices for $1—an immense source of revenue for the government.

Among the duck foods found in the United States, pond weeds are the favorite, with wild rice and wild celery rating high. Ducks, however, are largely animal feed-

(*Continued on page xviii*)

THERAPEUTIC POTENCY *and* RELATIVELY

LOW TOXICITY

*E*xperimental research and extensive clinical usage have demonstrated that Neoprontosil is a remarkably effective compound in streptococcus infections.

This antibacterial agent possesses characteristic chemical and physical properties. Its specific action is plainly not explainable on the basis of the amount of sulfanilamide set free in the body after its administration. This is evident by the many complete recoveries from very serious infections—including septicemia, strangles, metritis, mastitis, distemper and meningitis—which have been reported after the use of relatively small doses.

The toxicity of Neoprontosil is comparatively low. Successful treatment with Neoprontosil has been recorded in numerous cases of intolerance to sulfanilamide.

Write for booklet which contains detailed discussion of indications, dosage, manner of use and side effects.

HOW SUPPLIED

For Oral Administration: **Neoprontosil tablets of 5 grains, bottles of 50 and 500. (Caution: Not to be used for injection.)**

Neoprontosil capsules of 3 grains, bottles of 50 and 500. (Caution: Not to be used for injection.)

For Parenteral Administration: **Neoprontosil 5 per cent solution, bottles of 125 cc. with rubber diaphragm stopper.**

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NEOPRONTOSIL

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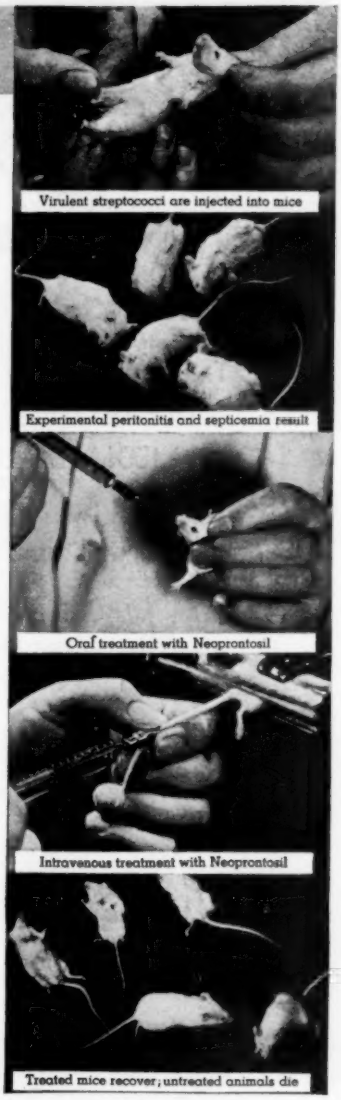
Brand of **AZOSULFAMIDE**

Disodium 4-sulfamido-phenyl-2-azo-7-acetyl-amino-1-hydroxynaphthalene 3,6 disulfonate.



Virulent streptococci are injected into mice

Experimental peritonitis and septicemia result

Oral treatment with Neoprontosil

Intravenous treatment with Neoprontosil

Treated mice recover; untreated animals die

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1. VITALITY Advertising appears in leading dog publications constantly.

2. Direct-mail pieces are sent at our expense to your prospects, offering a liberal FREE Sample to introduce VITALITY DOG FOODS in your trade area.

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5. We give you 100 lbs. free to start.

Don't Delay. Write for Complete Details.

VITALITY MILLS, Inc.
Board of Trade Chicago, Ill.

Animals That Make the News

(Continued from page xvi)

ers, eating insects, snails, frogs and fish. Wherever an abundance of food is found, there, also, an abundance of game will be found.

In the first few hours of the season the kill is the heaviest. The hunters have located all the confidential spots where the ducks are feeding, and several secret expeditions, each certain that no one else has discovered that spot, collide at every natural blind. It wasn't at all like that years ago when there were large lakes covered with ducks, and only a stray hunter ventured out. Then, live decoys were permitted, and hunting wasn't the competitive, tale-telling experience that the increasing scarcity of these birds has made it.

The first step in the hunting process today starts long before a shot is fired. You ungrudgingly exchange, at the post office, your dollar bill for a duck stamp; oil and put your gun in tip-top condition; study the weather forecast so that you may dress accordingly; then purchase new decoys, new game bags and plenty of ammunition. Your equipment must be just right.

Near the hunting lodge, where the beds are probably the sort that would evoke groans at home, you and your fellow hunters build the blind and wait impatiently for the hour the season opens. You spend a sleepless night, jump up at the first glimmer of daylight, bolt an inadequate breakfast and rush to the icy-cold blind to wait for sunrise.

Something must have gone amiss with your calculations and anticipations of finding that flock which "couldn't fail to be there." Even the telegram you received confirmed your own belief that "this year they're thicker than hair on a dog's back."

Out comes the old duck caller and those hours of homework are put to the test. The faithful Chesapeake Retriever, cramped up in the blind with the hunters, is straining to perform his duty. You just can't disappoint that dog even if it takes all day. Suddenly there is a hushed, anxious mo-

(Continued on page xx)

FROMM

The name that assures protection for the Veterinary Service and the maintenance of its high ethical standards

Continuous research and active pioneering in new phases of animal disease control at Fromm Laboratories has been a factor in the expansion and advancement of the field of veterinary medicine.

New opportunities and recognized progress in animal disease control developed by Fromm Laboratories are protected for the profession by Fromm's definite policy, which assures you that:

> *Every vaccine developed and produced by Fromm Laboratories is sold exclusively to licensed Graduate Veterinarians for their personal use and administration.*

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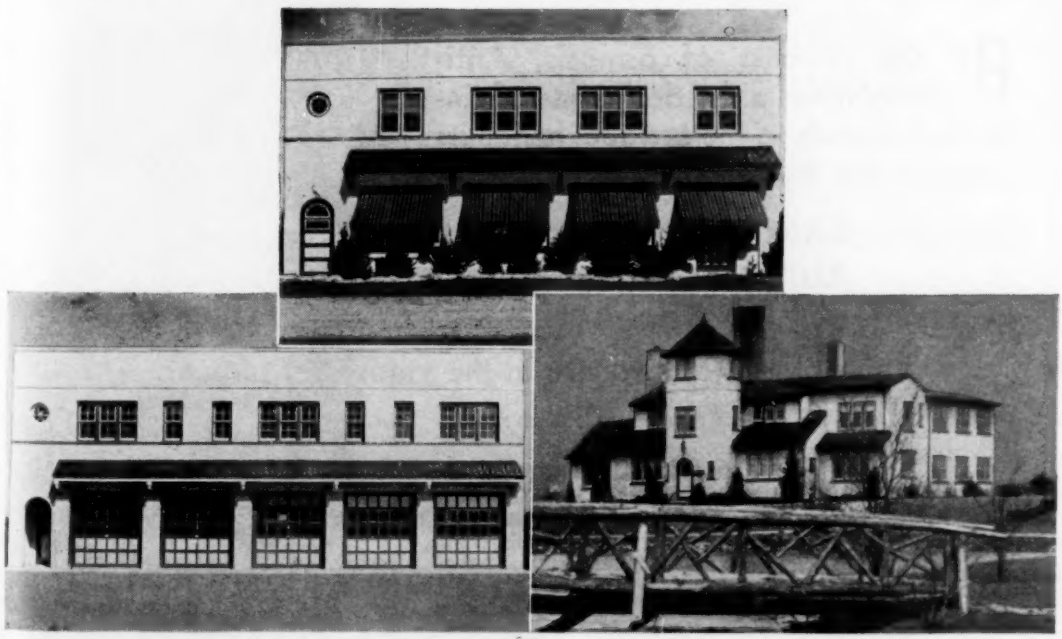

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Animals That Make the News

(*Continued from page xviii*)

ment when the first flock of "vees" whistles across the marsh, and one of those shots, practiced so often in imagination, goes "home."

You may have to stand in icy water waist high for hours, but that's all in the fun. A full bag, or only one duck, the tale, like a fish story, grows in the telling.

When, back home, the ducks are served, steaming and brown with a mound of wild rice and all the trimmings, some guest is sure to remark, "Just think, you shot these yourself and they didn't cost a cent. How lucky you are!" Just as if you hadn't lived, dreamed, suffered for days for this final triumph. But that's sport—the sport that every year makes more than a million hunters in the country put a ring around the calendar for the opening date of the season, so that they may have the agonizing joy of repeating that experience.

(*Continued on page xxii*)

OSMOSIS

BY the process of osmosis, Antiphlogistine aids drainage of infected wounds to the surface, hence its value in the treatment of

Skin Tears
Abrasions
Septic Sores

and other flesh wounds in the veterinary patient.

Let us send you a sample for clinical trial.

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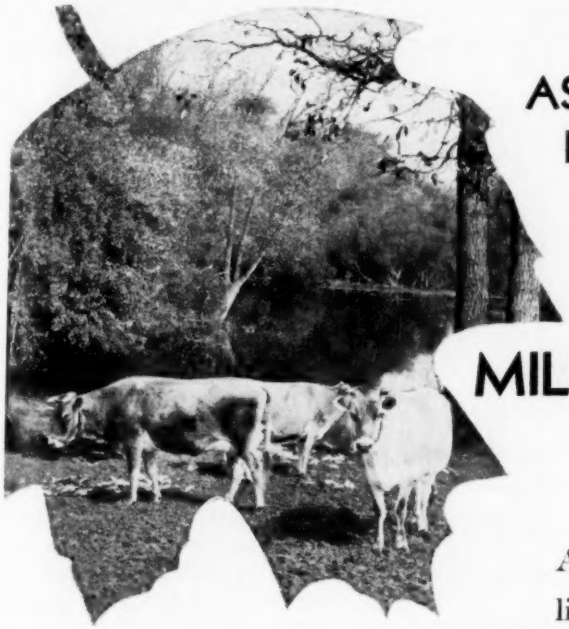

AS
LEAVES
FALL

... and pastures disappear

MILK-FLOW MAY DROP!

Absence of green pastures and sunlight may cause a deficiency of vital calcium, phosphorus, iodine and Vitamin D in dairy cows. This frequently leads to faulty lactation, lessened butterfat content, rickets, hairlessness and goitre trouble and may reflect in the offspring. Help prevent and correct these conditions by recommending Via-D-Mineral.

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Via-D-Mineral is guaranteed to contain sufficient VITAMIN D for the correct assimilation of its vital minerals . . . CALCIUM and PHOSPHORUS . . . IODINE.

Packed in 25 lb. and 100 lb. drums. Write for prices and descriptive literature today.

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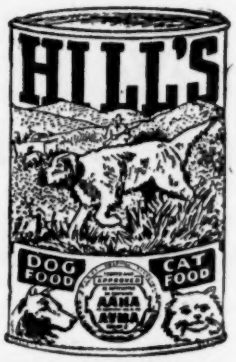

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Prices

Single Bottle	$ 2.00
¼ Dozen (1 Bottle Free)	5.00
½ Dozen (2 Bottles Free)	8.00
1 Dozen (4 Bottles Free)	15.00
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CARTER-LUFF CHEMICAL CO.

Hudson, N. Y.

Animals That Make the News

(Continued from page xx)

Tailless Dogs Manufactured

In the September 1940 issue, page xxvi, under "Animals That Make the News" it was announced that the Schipperke is the only dog born without a tail, whereupon the *Dog World* (Capt. Will Judy speaking) reminded us that "it is born with a tail." Inasmuch as lopping the tail off of this breed (literally) was taken from *Dog Encyclopedia* of the Judy series, we received the following reply to our reminder of our source of information. Here it is:

"Here is a strange thing—very few standards of breeds specify that tails are to be docked or ears cropped. There is not a word, for instance, in the standards of the Fox Terrier, that the tail is to be docked or shortened.

"Another instance is that the Dane standard says not a word about the cropping of ears. The reference to the tail in the standard of the Schipperke says under 'hindquarters': . . . tailless (about an inch allowed). Occasionally the Schipperke is termed tailless. This is true with other breeds just as it is true that certain dogs may be born tailless. But, the Schipperke has a natural, normal tail which is docked within three or four days after birth.

"The shortest docking of any breed is leaving just one joint. There have been instances where the docking was done too close to the spinal cord and death ensued."

The Future of Racing in England

A *denouement* of war is signalized in *Notes and News* of *The Veterinary Record* (Aug. 10, 1940) under the headline, "The Future of Racing." Stewards of the Jockey Club and of the National Hunt Committee appealed to the Ministry of Home Security for permission to conduct a limited racing program, all racing having been discontinued in June. Since racing at Dunstall Park closed on June 18, a large number of Thoroughbreds have been turned out or destroyed.

FIFTEEN YEARS

have elapsed since Lockhart and associates announced the development of Homologous Anti-Canine Distemper Serum and Virus (Antigen). (See August, 1925, Journal of American Veterinary Medical Association, and August, 1925, Veterinary Medicine.)

No biological product developed in the past twenty years has been of such great help to small animal practitioners as has Homologous Anti-Canine Distemper Serum (Lockhart) used alone as a curative agent, or to produce quick, short immunity; used simultaneously with Canine Distemper Virus (Antigen) to produce short durable immunity.

During the past fifteen years many minor improvements have been made in these products, all of which add to their usefulness. Dogs treated by the Lockhart method number in the hundreds of thousands, and field reports definitely prove its safety and high efficiency.

The producers of Homologous Serum (Lockhart) have not participated in any fancy fads or gone off on any unsound tangents, but during fifteen years of commercial production have constantly endeavored to improve the products and methods shown by wide use to be safe, practical and efficient in the control of canine distemper. The result is that Homologous Serum (Lockhart) retains its position as the

FOREMOST

agent of choice of many careful graduate veterinarians.

ASHE LOCKHART, INC.

"Producers of Better Biologicals for Graduate Veterinarians."

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For Relapses

when low blood serum Magnesium accompanies low blood serum Calcium, complicated by Ketosis, as observed in some Milk Fever cases that relapse after injections of Calcium Gluconate—

USE JEN-SAL *D-C-M Solution*

A stable solution containing 3½ ounces Dextrose, 3-7/10 ounces Calcium Borogluconate, and 2/3 ounce Magnesium Borogluconate per 500 c.c., with traces of Phosphates.

Each 500 c.c. of Jen-Sal D-C-M solution is the equivalent of 350 c.c. of C-B-G Solution (25.7% Calcium Borogluconate), 200 c.c. of Jen-Sal 50% Dextrose Solution, and 500 c.c. of 6.5% Magnesium Borogluconate Solution.

The clinical picture of the true Milk Fever case merges into that seen in cases of low serum Magnesium so that no clear-cut distinction is possible, but these cases which relapse may show a lowered serum Magnesium.

JENSEN - SALSBERY LABORATORIES, INC
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